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Note: Addenda information is NOT included with the electronic documents available via electronic file transfer. Only bidder or non-bidder package holders listed with the Caltrans Plans and Bid Documents section as described above will receive addenda information.



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS **AND** **SPECIAL PROVISIONS**

FOR CONSTRUCTION ON STATE HIGHWAY IN
SACRAMENTO COUNTY NEAR SACRAMENTO ON ROUTE 5 AT 0.7 km NORTH OF AIRPORT
BOULEVARD OVERCROSSING AND ON ROUTE 99 AT 0.9 km SOUTH OF ELVERTA ROAD

DISTRICT 03, ROUTES 5,99

**For Use in Connection with Standard Specifications Dated JULY 1999, Standard Plans Dated JULY 1999, and Labor
Surcharge and Equipment Rental Rates.**

CONTRACT NO. 03-0C4104

03-Sac-5,99-53.4,56.0

Bids Open: July 10, 2001
Dated: June 18, 2001

IMPORTANT SPECIAL NOTICES

- Attention is directed to the Notice to Contractor and Section 1, "Plans and Specifications," of the special provisions regarding references to the District and District Director's Office. The Office of the District Director for the Northern Region is located at Marysville.
- **Payment Bonds**
Attention is directed to Section 5 of the Special Provisions, regarding contract bonds. The payment bond shall be in a sum not less than one hundred percent of the total amount payable by the terms of the contract.
- Attention is directed to Section 11-2, "Portland Cement Concrete," of these Special Provisions which contains Section 90, "Portland Cement Concrete," of the Standard Specifications.
- Attention is directed to "Miscellaneous Metal," in Section 8-1, "Miscellaneous," of these Special Provisions for new requirements for miscellaneous metal.

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STANDARD PLANS LIST

The Standard Plan sheets applicable to this contract include, but are not limited to those indicated below. The Revised Standard Plans (RSP) and New Standard Plans (NSP) which apply to this contract are included as individual sheets of the project plans.

| | |
|----------|---|
| A10A | Abbreviations |
| A10B | Symbols |
| A20A | Pavement Markers and Traffic Lines, Typical Details |
| A20B | Pavement Markers and Traffic Lines, Typical Details |
| RSP A73C | Delineators, Channelizers and Barricades |
| D99B | Edge Drain Outlet and Vent Details |
| H8 | Planting and Irrigation Details |
| T1A | Temporary Crash Cushion, Sand Filled (Unidirectional) |
| T1B | Temporary Crash Cushion, Sand Filled (Bidirectional) |
| RSP T2 | Temporary Crash Cushion, Sand Filled (Shoulder Installations) |
| T3 | Temporary Railing (Type K) |
| T10 | Traffic Control System for Lane Closure On Freeways and Expressways |
| T13 | Traffic Control System for Lane Closure On Two Lane Conventional Highways |
| T14 | Traffic Control System for Ramp Closure |
| T17 | Traffic Control System for Moving Lane Closure On Two Lane Highways |
| RS1 | Roadside Signs, Typical Installation Details No. 1 |
| RS2 | Roadside Signs - Wood Post, Typical Installation Details No. 2 |
| ES-1A | Signal, Lighting and Electrical Systems - Symbols and Abbreviations |
| ES-1B | Signal, Lighting and Electrical Systems - Symbols and Abbreviations |
| ES-3C | Signal, Lighting and Electrical Systems - Controller Cabinet Details |
| ES-3D | Signal, Lighting and Electrical Systems - Telephone Demarcation Cabinet Details, Type A |
| ES-4B | Signal, Lighting and Electrical Systems - Signal Heads and Mountings |
| ES-5A | Signal, Lighting and Electrical Systems - Detectors |
| ES-5B | Signal, Lighting and Electrical Systems - Detectors |
| ES-8 | Signal, Lighting and Electrical Systems - Pull Box Details |

State Project with DVBE Goals (06-14-00)

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

CONTRACT NO. 03-0C4104

03-Sac-5,99-53.4,56.0

Sealed proposals for the work shown on the plans entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROJECT PLANS FOR CONSTRUCTION ON STATE HIGHWAY IN SACRAMENTO COUNTY NEAR SACRAMENTO ON ROUTE 5 AT 0.7 km NORTH OF AIRPORT BOULEVARD OVERCROSSING AND ON ROUTE 99 AT 0.9 km SOUTH OF ELVERTA ROAD

will be received at the Department of Transportation, 1120 N Street, Room 0200, MS #26, Sacramento, CA 95814, until 2 o'clock p.m. on July 10, 2001, at which time they will be publicly opened and read in Room 0100 at the same address.

Proposal forms for this work are included in a separate book entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROPOSAL AND CONTRACT FOR CONSTRUCTION ON STATE HIGHWAY IN SACRAMENTO COUNTY NEAR SACRAMENTO ON ROUTE 5 AT 0.7 km NORTH OF AIRPORT BOULEVARD OVERCROSSING AND ON ROUTE 99 AT 0.9 km SOUTH OF ELVERTA ROAD

General work description: Install weigh-in-motion system.

This project has a goal of 3 percent disabled veteran business enterprise (DVBE) participation.

No prebid meeting is scheduled for this project.

Bids are required for the entire work described herein.

At the time this contract is awarded, the Contractor shall possess either a Class A license or one of the following Class C licenses: C-8, C-10.

The Contractor must also be properly licensed at the time the bid is submitted, except that on a joint venture bid a joint venture license may be obtained by a combination of licenses after bid opening but before award in conformance with Business and Professions Code, Section 7029.1.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Preference will be granted to bidders properly certified as a "Small Business" as determined by the Department of General Services, Office of Small Business Certification and Resources at the time of bid opening in conformance with the provisions in Section 2-1.05, "Small Business Preference," of the special provisions, and Section 1896 et seq, Title 2, California Code of Regulations. A form for requesting a "Small Business" preference is included with the bid documents. Applications for status as a "Small Business" must be submitted to the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814, Telephone No. (916) 322-5060.

A reciprocal preference will be granted to "California company" bidders in conformance with Section 6107 of the Public Contract Code. (See Sections 2 and 3 of the special provisions.) A form for indicating whether bidders are or are not a "California company" is included in the bid documents and is to be filled in and signed by all bidders.

The District in which the work for this project is located has been incorporated into the Department's Northern Region. References in the Standard Specifications or in the special provisions to the district shall be deemed to mean the Northern Region. The office of the District Director for the Northern Region is located at Marysville.

Project plans, special provisions, and proposal forms for bidding this project can only be obtained at the Department of Transportation, Plans and Bid Documents, Room 0200, MS #26, Transportation Building, 1120 N Street, Sacramento, California 95814, FAX No. (916) 654-7028, Telephone No. (916) 654-4490. Use FAX orders to expedite orders for project plans, special provisions and proposal forms. FAX orders must include credit card charge number, card expiration date and authorizing signature. Project plans, special provisions, and proposal forms may be seen at the above Department of Transportation office and at the offices of the District Directors of Transportation at Irvine, Oakland, and the district in which the work is situated. Standard Specifications and Standard Plans are available through the State of California, Department of Transportation, Publications Unit, 1900 Royal Oaks Drive, Sacramento, CA 95815, Telephone No. (916) 445-3520.

Cross sections for this project are not available.

The successful bidder shall furnish a payment bond and a performance bond.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated, and available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>. Future effective general prevailing wage rates which have been predetermined and are on file with the Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

DEPARTMENT OF TRANSPORTATION

Deputy Director Transportation Engineering

Dated June 18, 2001

RS

COPY OF ENGINEER'S ESTIMATE
(NOT TO BE USED FOR BIDDING PURPOSES)

03-0C4104

| Item | Item Code | Item | Unit of Measure | Estimated Quantity |
|-----------|-----------|--|-----------------|--------------------|
| 1 | 021578 | TEMPORARY FENCE (TYPE ESA) | M | 220 |
| 2 | 120090 | CONSTRUCTION AREA SIGNS | LS | LUMP SUM |
| 3 | 120100 | TRAFFIC CONTROL SYSTEM | LS | LUMP SUM |
| 4 | 128650 | PORTABLE CHANGEABLE MESSAGE SIGN | LS | LUMP SUM |
| 5 | 190101 | ROADWAY EXCAVATION | M3 | 64 |
| 6 | 260201 | CLASS 2 AGGREGATE BASE | M3 | 51 |
| 7 | 390102 | ASPHALT CONCRETE (TYPE A) | TONN | 26 |
| 8 | 401102 | CONCRETE PAVEMENT (WEIGH-IN-MOTION) | M3 | 540 |
| 9 (S) | 021579 | GRIND EXISTING ASPHALT CONCRETE PAVEMENT | M2 | 410 |
| 10 | 681136 | 50 MM PLASTIC PIPE (EDGE DRAIN OUTLET) | M | 25 |
| 11 (S) | 840656 | PAINT TRAFFIC STRIPE (2-COAT) | M | 520 |
| 12 (S) | 850101 | PAVEMENT MARKER (NON-REFLECTIVE) | EA | 80 |
| 13 (S) | 850111 | PAVEMENT MARKER (RETROREFLECTIVE) | EA | 40 |
| 14 | 861203 | HIGH SPEED WEIGH-IN-MOTION SYSTEM | LS | LUMP SUM |
| 15 | 999990 | MOBILIZATION | LS | LUMP SUM |

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

Annexed to Contract No. 03-0C4104

SECTION 1. SPECIFICATIONS AND PLANS

The work embraced herein shall conform to the provisions in the Standard Specifications dated July 1999, and the Standard Plans dated July 1999, of the Department of Transportation insofar as the same may apply, and these special provisions.

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the indented text or table following the term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

The District in which the work for this project is located has been incorporated into the Department's Northern Region. References in the Standard Specifications or in these special provisions to the district shall be deemed to mean the Northern Region. The office of the District Director for the Northern Region is located at Marysville.

In case of conflict between the Standard Specifications and these special provisions, the special provisions shall take precedence over and shall be used in lieu of the conflicting portions.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 GENERAL

The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

In addition to the subcontractors required to be listed in conformance with Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications, each proposal shall have listed therein the name and address of each DVBE subcontractor to be used for credit in meeting the goal, and to whom the bidder proposes to directly subcontract portions of the work. The list of subcontractors shall also set forth the portion of work that will be performed by each subcontractor listed. A sheet for listing the subcontractors is included in the Proposal.

The Bidder's Bond form mentioned in the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications will be found following the signature page of the Proposal.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

Submit request for substitution of an "or equal" item, and the data substantiating the request to the Department of Transportation, P.O. Box 911, Marysville, CA 95901, Attn: NRCO/Contract Administration Engineer, so that the request is received by the Department by close of business on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening.

2-1.02 DISABLED VETERAN BUSINESS ENTERPRISE (DVBE)

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish a goal for Disabled Veterans Business Enterprise (DVBE) in contracts.

It is the policy of the Department that Disabled Veteran Business Enterprise (DVBE) shall have the maximum opportunity to participate in the performance of contracts financed solely with state funds. The Contractor shall ensure that DVBEs have the maximum opportunity to participate in the performance of this contract and shall take all necessary and reasonable steps for this assurance. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in

the award and performance of subcontracts. Failure to carry out the requirements of this paragraph shall constitute a breach of contract and may result in termination of this contract or other remedy the Department may deem appropriate.

Bidder's attention is directed to the following:

- A. "Disabled Veteran Business Enterprise" (DVBE) means a business concern certified as a DVBE by the Office of Small Business Certification and Resources, Department of General Services.
- B. A DVBE may participate as a prime contractor, subcontractor, joint venture partner with a prime or subcontractor, or vendor of material or supplies.
- C. Credit for DVBE prime contractors will be 100 percent.
- D. A DVBE joint venture partner must be responsible for specific contract items of work, or portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DVBE joint venture partner must share in the ownership, control, management responsibilities, risks and profits of the joint venture. The DVBE joint venturer must submit the joint venture agreement with the Caltrans Bidder DVBE Information form required in Section 2-1.04, "Submission of DVBE Information," elsewhere in these special provisions.
- E. A DVBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work.
- F. Credit for DVBE vendors of materials or supplies is limited to 60 percent of the amount to be paid to the vendor for the material unless the vendor manufactures or substantially alters the goods.
- G. Credit for trucking by DVBEs will be as follows:
 - 1. One hundred percent of the amount to be paid when a DVBE trucker will perform the trucking with his/her own trucks, tractors and employees.
 - 2. Twenty percent of the amount to be paid to DVBE trucking brokers who do not have a "certified roster."
 - 3. One hundred percent of the amount to be paid to DVBE trucking brokers who have signed agreements that all trucking will be performed by DVBE truckers if credit is toward the DVBE goal, a "certified roster" showing that all trucks are owned by DVBEs, and a signed statement on the "certified roster" that indicates that 100 percent of revenue paid by the broker will be paid to the DVBEs listed on the "certified roster."
 - 4. Twenty percent of the amount to be paid to trucking brokers who are not a DVBE but who have signed agreements with DVBE truckers assuring that at least 20 percent of the trucking will be performed by DVBE truckers if credit is toward the DVBE goal, a "certified roster" showing that at least 20 percent of the number of trucks are owned by DVBE truckers, and a signed statement on the "certified roster" that indicates that at least 20 percent of the revenue paid by the broker will be paid to the DVBEs listed on the "certified roster."

The "certified roster" referred to herein shall conform to the requirements in Section 2-1.04, "Submission Of DVBE Information," elsewhere in these special provisions.

- H. DVBEs and DVBE joint venture partners must be certified DVBEs as determined by the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814, on the date bids for the project are opened before credit may be allowed toward the DVBE goal. It is the Contractor's responsibility to verify that DVBEs are certified.
- I. Noncompliance by the Contractor with these requirements constitutes a breach of this contract and may result in termination of the contract or other appropriate remedy for a breach of this contract.

2-1.03 DVBE GOAL FOR THIS PROJECT

The Department has established the following goal for Disabled Veteran Business Enterprise (DVBE) participation for this project:

Disabled Veteran Business Enterprise (DVBE): 3 percent.

It is the bidder's responsibility to make a sufficient portion of the work available to subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DVBE subcontractors and suppliers, so as to assure meeting the goal for DVBE participation.

The Office of Small Business Certification and Resources, Department of General Services, may be contacted at (916) 322-5060 or visit their internet web site at <http://www.osmb.dgs.ca.gov/> for program information and certification status. The Department's Business Enterprise Program may also be contacted at (916) 227-9599 or the internet web site at <http://www.dot.ca.gov/hq/bep/>.

2-1.04 SUBMISSION OF DVBE INFORMATION

The required DVBE information shall be submitted on the "CALTRANS BIDDER - DVBE INFORMATION" form included in the Proposal. If this information is not submitted with the bid, the DVBE information forms shall be removed from the documents prior to submitting the bid.

It is the bidder's responsibility to make enough work available to DVBEs and to select those portions of the work or material needs consistent with the available DVBEs to meet the goal for DVBE participation or to provide information to establish that, prior to bidding, the bidder made adequate good faith efforts to do so.

If the DVBE information is not submitted with the bid, the apparent successful bidder (low bidder), the second low bidder and the third low bidder shall submit the DVBE information to the Department of Transportation, 1120 N Street, Room 0200, MS #26, Sacramento, California 95814 so the information is received by the Department no later than 4:00 p.m. on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening. DVBE information sent by U.S. Postal Service certified mail with return receipt and certificate of mailing and mailed on or before the third day, not including Saturdays, Sundays and legal holidays, following bid opening will be accepted even if it is received after the fourth day following bid opening. Failure to submit the required DVBE information by the time specified will be grounds for finding the bid or proposal nonresponsive. Other bidders need not submit DVBE information unless requested to do so by the Department.

The bidder's DVBE information shall establish that good faith efforts to meet the DVBE goal have been made. To establish good faith efforts, the bidder shall demonstrate that the goal will be met or that, prior to bidding, adequate good faith efforts to meet the goal were made.

Bidders are cautioned that even though their submittal indicates they will meet the stated DVBE goal, their submittal should also include their adequate good faith efforts information along with their DVBE goal information to protect their eligibility for award of the contract in the event the Department, in its review, finds that the goal has not been met.

The bidder's DVBE information shall include the names of DVBE firms that will participate, with a complete description of work or supplies to be provided by each, the dollar value of each DVBE transaction, and a written confirmation from the DVBE that it is participating in the contract. A copy of the DVBE's quote will serve as written confirmation that the DVBE is participating in the contract. When 100 percent of a contract item of work is not to be performed or furnished by a DVBE, a description of the exact portion of that work to be performed or furnished by that DVBE shall be included in the DVBE information, including the planned location of that work. The work that a DVBE prime contractor has committed to performing with its own forces as well as the work that it has committed to be performed by DVBE subcontractors, suppliers and trucking companies will count toward the goal.

If credit for trucking by a DVBE trucking broker is shown on the bidder's information as 100 percent of the revenue to be paid by the broker is to be paid to DVBE truckers, a "certified roster" of the broker's trucks to be used must be included. The "certified roster" must indicate that all the trucks are owned by certified DVBEs and must show the DVBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DVBE certification numbers. The roster must indicate that all revenue paid by the broker will be paid to DVBEs listed on the "certified roster".

If credit for trucking by a trucking broker who is not a DVBE is shown in the bidder's information, a "certified roster" of the broker's trucks to be used must be included. The "certified roster" must indicate that at least 20 percent of the broker's trucks are owned by certified DVBEs and must show the DVBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DVBE certification number. The roster must indicate that at least 20 percent of the revenue paid by the broker will be paid to DVBEs listed on the "certified roster".

A bidder shall be deemed to have made good faith efforts upon submittal, within time limits specified by the Department, of documentary evidence that all of the following actions were taken:

- A. Contact was made with the Office of Small Business Certification and Resources (OSBCR), Department of General Services or their web site at <http://www.osmb.dgs.ca.gov/> to identify Disabled Veteran Business Enterprises.
- B. Advertising was published in trade media and media focusing on Disabled Veteran Business Enterprises, unless time limits imposed by the Department do not permit that advertising.
- C. Invitations to bid were submitted to potential Disabled Veteran Business Enterprise contractors.
- D. Available Disabled Veteran Business Enterprises were considered.

2-1.05 SMALL BUSINESS PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

Attention is also directed to the Small Business Procurement and Contract Act, Government Code Section 14835, et seq and Title 2, California Code of Regulations, Section 1896, et seq.

Bidders who wish to be classified as a Small Business under the provisions of those laws and regulations, shall be certified as Small Business by the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814.

To request Small Business Preference, bidders shall fill out and sign the Request for Small Business Preference form in the Proposal and shall attach a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form. The bidder's signature on the Request for Small Business Preference certifies, under penalty of perjury, that the bidder is certified as Small Business at the time of bid opening and further certifies, under penalty of perjury, that under the following conditions, at least 50 percent of the subcontractors to be utilized on the project are either certified Small Business or have applied for Small Business certification by bid opening date and are subsequently granted Small Business certification.

The conditions requiring the aforementioned 50 percent level of subcontracting by Small Business subcontractors apply if:

- A. The lowest responsible bid for the project exceeds \$100,000; and
- B. The project work to be performed requires a Class A or a Class B contractor's license; and
- C. Two or more subcontractors will be used.

If the above conditions apply and Small Business Preference is granted in the award of the contract, the 50 percent Small Business subcontractor utilization level shall be maintained throughout the life of the contract.

2-1.06 CALIFORNIA COMPANY PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

In conformance with the requirements of Section 6107 of the Public Contract Code, a "California company" will be granted a reciprocal preference for bid comparison purposes as against a nonresident contractor from any state that gives or requires a preference to be given contractors from that state on its public entity construction contracts.

A "California company" means a sole proprietorship, partnership, joint venture, corporation, or other business entity that was a licensed California contractor on the date when bids for the public contract were opened and meets one of the following:

- A. Has its principal place of business in California.
- B. Has its principal place of business in a state in which there is no local contractor preference on construction contracts.
- C. Has its principal place of business in a state in which there is a local contractor construction preference and the contractor has paid not less than \$5000 in sales or use taxes to California for construction related activity for each of the five years immediately preceding the submission of the bid.

To carry out the "California company" reciprocal preference requirements of Section 6107 of the Public Contract Code, all bidders shall fill out and sign the California Company Preference form in the Proposal. The bidder's signature on the California Company Preference form certifies, under penalty of perjury, that the bidder is or is not a "California company" and if not, the amount of the preference applied by the state of the nonresident Contractor.

A nonresident Contractor shall disclose any and all bid preferences provided to the nonresident Contractor by the state or country in which the nonresident Contractor has its principal place of business.

Proposals without the California Company Preference form filled out and signed may be rejected.

SECTION 3. AWARD AND EXECUTION OF CONTRACT

The bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract," of the Standard Specifications and these special provisions for the requirements and conditions concerning award and execution of contract.

The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed and who has met the goal for DVBE participation or has demonstrated, to the satisfaction of the Department, adequate good faith efforts to do so. Meeting the goal for DVBE participation or demonstrating, to the satisfaction of the Department, adequate good faith efforts to do so is a condition for being eligible for award of contract.

A "Payee Data Record" form will be included in the contract documents to be executed by the successful bidder. The purpose of the form is to facilitate the collection of taxpayer identification data. The form shall be completed and returned to the Department by the successful bidder with the executed contract and contract bonds. For the purposes of the form, payee shall be deemed to mean the successful bidder. The form is not to be completed for subcontractors or suppliers. Failure to complete and return the "Payee Data Record" form to the Department as provided herein will result in the retention of 20 percent of payments due the contractor and penalties of up to \$20,000. This retention of payments for failure to complete the "Payee Data Record" form is in addition to any other retention of payments due the Contractor.

Attention is also directed to "Small Business Preference" of these special provisions. Any bidder who is certified as a Small Business by the Department of General Services, Office of Small Business Certification and Resources will be allowed a preference in the award of this contract, if it be awarded, under the following conditions:

- A. The apparent low bidder is not certified as a Small Business, or has not filled out and signed the Request for Small Business Preference included with the bid documents and attached a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form; and
- B. The bidder filled out and signed the Request for Small Business Preference form included with the bid documents and attached a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form.

The small business preference will be a reduction in the bid submitted by the small business contractor, for bid comparison purposes, by an amount equal to 5 percent of the amount bid by the apparent low bidder, the amount not to exceed \$50,000. If this reduction results in the small business contractor becoming the low bidder, then the contract will be awarded to the small business contractor on the basis of the actual bid of the small business contractor notwithstanding the reduced bid price used for bid comparison purposes.

Attention is also directed to "California Company Preference" of these special provisions.

The amount of the California company reciprocal preference shall be equal to the amount of the preference applied by the state of the nonresident contractor with the lowest responsive bid, except where the "California company" is eligible for a California Small Business Preference, in which case the preference applied shall be the greater of the two, but not both.

If the bidder submitting the lowest responsive bid is not a "California company" and with the benefit of the reciprocal preference, a "California company's" responsive bid is equal to or less than the original lowest responsive bid, the "California company" will be awarded the contract at its submitted bid price except as provided below.

Small business bidders shall have precedence over nonsmall business bidders in that the application of the "California company" preference for which nonsmall business bidders may be eligible shall not result in the denial of the award to a small business bidder.

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Section 8-1.03, "Beginning of Work," in Section 8-1.06, "Time of Completion," and in Section 8-1.07, "Liquidated Damages," of the Standard Specifications and these special provisions.

The Contractor shall furnish the Engineer with a statement from the vendor that the order for the electrical materials required for this contract has been received and accepted by the vendor; and the statement shall be furnished within 15 calendar days after the contract has been approved by the Attorney General, or the attorney appointed and authorized to represent the Department of Transportation. The statement shall give the date that the electrical materials will be shipped. If the Contractor has the necessary materials on hand, the Contractor will not be required to furnish the vendor's statement.

The Contractor shall begin work within 30 calendar days after the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department of Transportation.

The work shall be diligently prosecuted to completion before the expiration of **75 WORKING DAYS** beginning on the date that work begins, or beginning on the thirtieth calendar day after approval of the contract, whichever occurs first.

The Contractor shall pay to the State of California the sum of \$500 per day, for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed above.

The 72 hours advance notice before beginning work specified in Section 8-1.03, "Beginning of Work," of the Standard Specifications is changed to 5 days advance notice for this project.

SECTION 5. GENERAL

SECTION 5-1. MISCELLANEOUS

5-1.01 PLANS AND WORKING DRAWINGS

When the specifications require working drawings to be submitted to the Division of Structure Design, the drawings shall be submitted to: Division of Structure Design, Documents Unit, Mail Station 9, 1801 30th Street, Sacramento, CA 95816, Telephone 916 227-8252.

5-1.011 EXAMINATION OF PLANS, SPECIFICATIONS, CONTRACT, AND SITE OF WORK

The second paragraph of Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," of the Standard Specifications is amended to read:

- Where the Department has made investigations of site conditions, including subsurface conditions in areas where work is to be performed under the contract, or in other areas, some of which may constitute possible local material sources, bidders or Contractors may, upon written request, inspect the records of the Department as to those investigations subject to and upon the conditions hereinafter set forth.

Attention is directed to "Differing Site Conditions" of these special provisions regarding physical conditions at the site which may differ from those indicated in "Materials Information," log of test borings or other geotechnical information obtained by the Department's investigation of site conditions.

5-1.012 DIFFERING SITE CONDITIONS

Attention is directed to Section 5-1.116, "Differing Site Conditions," of the Standard Specifications.

During the progress of the work, if subsurface or latent conditions are encountered at the site differing materially from those indicated in the "Materials Information," log of test borings, other geotechnical data obtained by the Department's investigation of subsurface conditions, or an examination of the conditions above ground at the site, the party discovering those conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

The Contractor will be allowed 15 days from the notification of the Engineer's determination of whether or not an adjustment of the contract is warranted, in which to file a notice of potential claim in conformance with the provisions of Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications and as specified herein; otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The notice of potential claim shall set forth in what respects the Contractor's position differs from the Engineer's determination and provide any additional information obtained by the Contractor, including but not limited to additional geotechnical data. The notice of potential claim shall be accompanied by the Contractor's certification that the following were made in preparation of the bid: a review of the contract, a review of the "Materials Information," a review of the log of test borings and other records of geotechnical data to the extent they were made available to bidders prior to the opening of bids, and an examination of the conditions above ground at the site. Supplementary information, obtained by the Contractor subsequent to the filing of the notice of potential claim, shall be submitted to the Engineer in an expeditious manner.

5-1.015 LABORATORY

When a reference is made in the specifications to the "Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations of the Department of Transportation, or established laboratories of the various Districts of the Department, or other laboratories authorized by the Department to test materials and work involved in the contract. When a reference is made in the specifications to the "Transportation Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations, located at 5900 Folsom Boulevard, Sacramento, CA 95819, Telephone (916) 227-7000.

5-1.017 CONTRACT BONDS

Attention is directed to Section 3-1.02, "Contract Bonds," of the Standard Specifications and these special provisions.

The payment bond shall be in a sum not less than one hundred percent of the total amount payable by the terms of the contract.

5-1.018 EXCAVATION SAFETY PLANS

Section 5-1.02A, "Trench Excavation Safety Plans," of the Standard Specifications is amended to read:

5-1.02A Excavation Safety Plans

- The Construction Safety Orders of the Division of Occupational Safety and Health shall apply to all excavations. For all excavations 1.5 m or more in depth, the Contractor shall submit to the Engineer a detailed plan showing the design and details of the protective systems to be provided for worker protection from the hazard of caving ground during excavation. The detailed plan shall include any tabulated data and any design calculations used in the preparation of the plan. Excavation shall not begin until the detailed plan has been reviewed and approved by the Engineer.
- Detailed plans of protective systems for which the Construction Safety Orders require design by a registered professional engineer shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State

of California, and shall include the soil classification, soil properties, soil design calculations that demonstrate adequate stability of the protective system, and any other design calculations used in the preparation of the plan.

- No plan shall allow the use of a protective system less effective than that required by the Construction Safety Orders.
- If the detailed plan includes designs of protective systems developed only from the allowable configurations and slopes, or Appendices, contained in the Construction Safety Orders, the plan shall be submitted at least 5 days before the Contractor intends to begin excavation. If the detailed plan includes designs of protective systems developed from tabulated data, or designs for which design by a registered professional engineer is required, the plan shall be submitted at least 3 weeks before the Contractor intends to begin excavation.
- Attention is directed to Section 7-1.01E, "Trench Safety."

The third paragraph of Section 19-1.02, "Preservation of Property," of the Standard Specifications is amended to read:

- In addition to the provisions in Sections 5-1.02, "Plans and Working Drawings," and 5-1.02A, "Excavation Safety Plans," detailed plans of the protective systems for excavations on or affecting railroad property will be reviewed for adequacy of protection provided for railroad facilities, property, and traffic. These plans shall be submitted at least 9 weeks before the Contractor intends to begin excavation requiring the protective systems. Approval by the Engineer of the detailed plans for the protective systems will be contingent upon the plans being satisfactory to the railroad company involved.

5-1.019 COST REDUCTION INCENTIVE

Attention is directed to Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications.

Prior to preparing a cost reduction proposal, the Contractor shall request a meeting with the Engineer to discuss the proposal in concept and to determine the merit of the cost reduction proposal. Items of discussion will also include permit issues, impact on other projects, impact on the project schedule, peer reviews, and review times required by the Department and other agencies.

5-1.02 LABOR NONDISCRIMINATION

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM

(GOV. CODE, SECTION 12990)

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination," of the Standard Specifications, which is applicable to all nonexempt State contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The specifications are applicable to all nonexempt State construction contracts and subcontracts of \$5000 or more.

5-1.03 INTEREST ON PAYMENTS

Interest shall be payable on progress payments, payments after acceptance, final payments, extra work payments, and claim payments as follows:

- A. Unpaid progress payments, payment after acceptance, and final payments shall begin to accrue interest 30 days after the Engineer prepares the payment estimate.
- B. Unpaid extra work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following receipt of a properly submitted and undisputed extra work bill. To be properly submitted, the bill must be submitted within 7 days of the performance of the extra work and in conformance with the provisions in Section 9-1.03C, "Records," and Section 9-1.06, "Partial Payments," of the Standard Specifications. An undisputed extra work bill not submitted within 7 days of performance of the extra work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.
- C. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments, and extra work payments shall be 10 percent per annum.
- D. The rate of interest payable on a claim, protest or dispute ultimately allowed under this contract shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to ascertain the basis and amount of said claim, protest or dispute.

The rate of interest payable on any award in arbitration shall be 6 percent per annum if allowed under the provisions of Civil Code Section 3289.

5-1.031 FINAL PAYMENT AND CLAIMS

Attention is directed to Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications.

If the Contractor files a timely written statement of claims in response to the proposed final estimate, the District that administers the contract will submit a claim position letter to the Contractor by hand delivery or deposit in the U.S. mail within 135 days of acceptance of the contract. The claim position letter will delineate the District's position on the Contractor's claims. If the Contractor disagrees with the claim position letter, the Contractor shall submit a written notification of its disagreement to be received by the District not later than 15 days after the Contractor's receipt of the claim position letter. The written notification of disagreement shall set forth the basis for the Contractor's disagreement and be submitted to the office designated in the claim position letter. The Contractor's failure to provide a timely, written notification of disagreement shall constitute the Contractor's acceptance and agreement with the determinations provided in the claim position letter and with final payment pursuant to the claim position letter.

If the Contractor files a timely notification of disagreement with the District claim position letter, the board of review designated by the District Director to review claims that remain in dispute will meet with the Contractor within 45 days after receipt by the District of the notification of disagreement. Attendance by the Contractor at the board of review meeting shall be mandatory.

If the District fails to submit a claim position letter to the Contractor within 135 days after the acceptance of the contract and the Contractor has claims that remain in dispute, the Contractor may request a meeting with the board of review designated by the District Director to review claims that remain in dispute. The Contractor's request for a meeting shall identify the claims that remain in dispute. If the Contractor files a request for a meeting, the board of review will meet with the Contractor within 45 days after the District receives the request for the meeting. Attendance by the Contractor at the District Director's board of review meeting shall be mandatory.

Failure of the Contractor to file a timely written statement of claims in response to the proposed final estimate, or to file a timely notification of disagreement with the District claim position letter, or to attend the District Director's board of review meeting shall constitute a failure to pursue diligently and exhaust the administrative procedures in the contract and shall be a bar to arbitration in conformance with the requirements in Section 10240.2 of the California Public Contract Code.

5-1.04 PUBLIC SAFETY

The Contractor shall provide for the safety of traffic and the public in conformance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these special provisions.

The Contractor shall install temporary railing (Type K) between a lane open to public traffic and an excavation, obstacle or storage area when the following conditions exist:

- A. Excavations.—The near edge of the excavation is 3.6 m or less from the edge of the lane, except:
 - 1. Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
 - 2. Excavations less than 0.3-m deep.
 - 3. Trenches less than 0.3-m wide for irrigation pipe or electrical conduit, or excavations less than 0.3-m in diameter.
 - 4. Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
 - 5. Excavations in side slopes, where the slope is steeper than 1:4 (vertical:horizontal).
 - 6. Excavations protected by existing barrier or railing.
- B. Temporarily Unprotected Permanent Obstacles.—The work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or the Contractor, for the Contractor's convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.
- C. Storage Areas.—Material or equipment is stored within 3.6 m of the lane and the storage is not otherwise prohibited by the provisions of the Standard Specifications and these special provisions.

The approach end of temporary railing (Type K), installed in conformance with the provisions in this section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications, shall be offset a minimum of 4.6 m from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than 0.3-m transversely to 3 m longitudinally with respect to the edge of the traffic lane. If the 4.6-m

minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications. Temporary railing (Type K), conforming to the details shown on 1999 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" of these special provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas, the Contractor shall close the adjacent traffic lane unless otherwise provided in the Standard Specifications and these special provisions:

| Approach Speed of Public Traffic (Posted Limit) (Kilometers Per Hour) | Work Areas |
|--|--|
| Over 72 (45 Miles Per Hour) | Within 1.8 m of a traffic lane but not on a traffic lane |
| 56 to 72 (35 to 45 Miles Per Hour) | Within 0.9-m of a traffic lane but not on a traffic lane |

The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When traffic cones or delineators are used to delineate a temporary edge of a traffic lane, the line of cones or delineators shall be considered to be the edge of the traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 3 m without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

Full compensation for conforming to the provisions in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

5-1.05 SURFACE MINING AND RECLAMATION ACT

Attention is directed to the Surface Mining and Reclamation Act of 1975, commencing in Public Resources Code, Mining and Geology, Section 2710, which establishes regulations pertinent to surface mining operations, and to California Public Contract Code Section 10295.5.

Material from mining operations furnished for this project shall only come from permitted sites in compliance with California Public Contract Code Section 10295.5.

The requirements of this section shall apply to materials furnished for the project, except for acquisition of materials in conformance with the provisions in Section 4-1.05, "Use of Materials Found on the Work," of the Standard Specifications.

5-1.06 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe. The Contractor shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In conformance with Section 25914.1 of the Health and Safety Code, removal of asbestos or hazardous substances including exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

5-1.07 YEAR 2000 COMPLIANCE

This contract is subject to Year 2000 Compliance for automated devices in the State of California.

Year 2000 compliance for automated devices in the State of California is achieved when embedded functions have or create no logical or mathematical inconsistencies when dealing with dates prior to and beyond 1999. The year 2000 is

recognized and processed as a leap year. The product shall operate accurately in the manner in which the product was intended for date operation without requiring manual intervention.

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for all automated devices furnished for the project.

5-1.08 SUBCONTRACTOR AND DVBE RECORDS

The Contractor shall maintain records of all subcontracts entered into with certified DVBE subcontractors and records of materials purchased from certified DVBE suppliers. The records shall show the name and business address of each DVBE subcontractor or vendor and the total dollar amount actually paid each DVBE subcontractor or vendor.

Upon completion of the contract, a summary of these records shall be prepared on Form CEM-2402 (S) and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer.

5-1.086 PERFORMANCE OF DVBE SUBCONTRACTORS AND SUPPLIERS

The DVBEs listed by the Contractor in response to the provisions in Section 2-1.04, "Submission of DVBE Information," and Section 3, "Award and Execution of Contract," of these special provisions, which are determined by the Department to be certified DVBEs, shall perform the work and supply the materials for which they are listed, unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources.

Authorization to utilize other forces or sources of materials may be requested for the following reasons:

- A. The listed DVBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when the written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of the subcontractor's or supplier's written bid, is presented by the Contractor.
- B. The listed DVBE becomes bankrupt or insolvent.
- C. The listed DVBE fails or refuses to perform the subcontract or furnish the listed materials.
- D. The Contractor stipulated that a bond was a condition of executing a subcontract and the listed DVBE subcontractor fails or refuses to meet the bond requirements of the Contractor.
- E. The work performed by the listed subcontractor is substantially unsatisfactory and is not in substantial conformance with the plans and specifications or the subcontractor is substantially delaying or disrupting the progress of the work.
- F. The listed DVBE subcontractor is not licensed pursuant to the Contractor's License Law.
- G. It would be in the best interest of the State.

The Contractor shall not be entitled to payment for the work or material unless it is performed or supplied by the listed DVBE or by other forces (including those of the Contractor) pursuant to prior written authorization of the Engineer.

5-1.09 SUBCONTRACTING

Attention is directed to the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, Section 2, "Proposal Requirements and Conditions," Section 2-1.04, "Submission of DVBE Information," and Section 3, "Award and Execution of Contract," of these special provisions and these special provisions.

Pursuant to the provisions in Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations web site at:

<http://www.dir.ca.gov/DLSE/Debar.html>.

The DVBE information furnished under Section 3-1.01A, "DVBE Information," of these special provisions is in addition to the subcontractor information required to be furnished in Section 8-1.01, "Subcontracting," and Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications.

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish a goal for Disabled Veteran Business Enterprise (DVBE) participation in highway contracts that are State funded. As a part of this requirement:

- A. No substitution of a DVBE subcontractor shall be made at any time without the written consent of the Department, and
- B. If a DVBE subcontractor is unable to perform successfully and is to be replaced, the Contractor shall make good faith efforts to replace the original DVBE subcontractor with another DVBE subcontractor.

The provisions in Section 2-1.02, "Disabled Veteran Business Enterprise (DVBE)," of these special provisions that DVBEs shall be certified on the date bids are opened does not apply to DVBE substitutions after award of the contract.

5-1.10 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

Attention is directed to the provisions in Sections 10262 and 10262.5 of the Public Contract Code and Section 7108.5 of the Business and Professions Code concerning prompt payment to subcontractors.

5-1.11 PUBLIC SAFETY

The Contractor shall provide for the safety of traffic and the public in conformance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these special provisions.

The Contractor shall install temporary railing (Type K) between a lane open to public traffic and an excavation, obstacle or storage area when the following conditions exist:

- A. Excavations.—The near edge of the excavation is 3.6 m or less from the edge of the lane, except:
 - 1. Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
 - 2. Excavations less than 0.3-m deep.
 - 3. Trenches less than 0.3-m wide for irrigation pipe or electrical conduit, or excavations less than 0.3-m in diameter.
 - 4. Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
 - 5. Excavations in side slopes, where the slope is steeper than 1:4 (vertical:horizontal).
 - 6. Excavations protected by existing barrier or railing.
- B. Temporarily Unprotected Permanent Obstacles.—The work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or the Contractor, for the Contractor's convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.
- C. Storage Areas.—Material or equipment is stored within 3.6 m of the lane and the storage is not otherwise prohibited by the provisions of the Standard Specifications and these special provisions.

The approach end of temporary railing (Type K), installed in conformance with the provisions in this section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications, shall be offset a minimum of 4.6 m from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than 0.3-m transversely to 3 m longitudinally with respect to the edge of the traffic lane. If the 4.6-m minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications. Temporary railing (Type K), conforming to the details shown on 1999 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" of these special provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas, the Contractor shall close the adjacent traffic lane unless otherwise provided in the Standard Specifications and these special provisions:

| Approach Speed of Public Traffic (Posted Limit) (Kilometers Per Hour) | Work Areas |
|--|--|
| Over 72 (45 Miles Per Hour) | Within 1.8 m of a traffic lane but not on a traffic lane |
| 56 to 72 (35 to 45 Miles Per Hour) | Within 0.9-m of a traffic lane but not on a traffic lane |

The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When traffic cones or delineators are used to delineate a temporary edge of a traffic lane, the line of cones or delineators shall be considered to be the edge of the traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 3 m without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

Full compensation for conforming to the provisions in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

5-1.12 AREAS FOR CONTRACTOR'S USE

Attention is directed to the provisions in Section 7-1.19, "Rights in Land and Improvements," of the Standard Specifications and these special provisions.

The highway right of way shall be used only for purposes that are necessary to perform the required work. The Contractor shall not occupy the right of way, or allow others to occupy the right of way, for purposes which are not necessary to perform the required work.

No State-owned parcels adjacent to the right of way are available for the exclusive use of the Contractor within the contract limits. The Contractor shall secure, at the Contractor's own expense, areas required for plant sites, storage of equipment or materials, or for other purposes.

No area is available within the contract limits for the exclusive use of the Contractor. However, temporary storage of equipment and materials on State property may be arranged with the Engineer, subject to the prior demands of State maintenance forces and to other contract requirements. Use of the Contractor's work areas and other State-owned property shall be at the Contractor's own risk, and the State shall not be held liable for damage to or loss of materials or equipment located within such areas.

5-1.13 PAYMENTS

Attention is directed to Sections 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these special provisions.

No partial payment will be made for any materials on hand which are furnished but not incorporated in the work.

5-1.14 ENVIRONMENTALLY SENSITIVE AREAS

The Contractor's attention is directed to the designated Environmentally Sensitive Areas (ESA), shown on the plans and State and Federal regulations which may pertain to such areas. The exact location of the boundaries of environmentally sensitive areas will be established by the Engineer. These areas are protected and no entry by the Contractor for any purpose will be allowed unless specifically authorized in writing by the Engineer. The Contractor shall take all necessary measures to ensure that his forces do not enter or disturb these areas, including giving written notice to his employees and subcontractors.

Attention is directed to "Order of Work" and "Temporary Fence (Type ESA)" elsewhere in these special provisions regarding boundary fencing.

Full compensation for complying with State and Federal regulations and protecting the environmentally sensitive areas shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed therefor.

The Contractor will be required to pay the cost of any mitigation or repairs to the environmentally sensitive areas shown on the plans, that are damaged or impacted by reason of the Contractor's or his subcontractor's operations and deductions from any monies due or to become due to the Contractor will be made to cover such cost.

SECTION 6. (BLANK)

SECTION 7. (BLANK)

SECTION 8. MATERIALS

SECTION 8-1. MISCELLANEOUS

8-1.01 SUBSTITUTION OF NON-METRIC MATERIALS AND PRODUCTS

Only materials and products conforming to the requirements of the specifications shall be incorporated in the work. When metric materials and products are not available, and when approved by the Engineer, and at no cost to the State, materials and products in the United States Standard Measures which are of equal quality and of the required properties and

characteristics for the purpose intended, may be substituted for the equivalent metric materials and products, subject to the following provisions:

- A. Materials and products shown on the plans or in the special provisions as being equivalent may be substituted for the metric materials and products specified or detailed on the plans.
- B. Before other non-metric materials and products will be considered for use, the Contractor shall furnish, at the Contractor's expense, evidence satisfactory to the Engineer that the materials and products proposed for use are equal to or better than the materials and products specified or detailed on the plans. The burden of proof as to the quality and suitability of substitutions shall be upon the Contractor and the Contractor shall furnish necessary information as required by the Engineer. The Engineer will be the sole judge as to the quality and suitability of the substituted materials and products and the Engineer's decision will be final.
- C. When the Contractor elects to substitute non-metric materials and products, including materials and products shown on the plans or in the special provisions as being equivalent, the list of sources of material specified in Section 6-1.01, "Source of Supply and Quality of Materials," of the Standard Specification shall include a list of substitutions to be made and contract items involved. In addition, for a change in design or details, the Contractor shall submit plans and working drawings in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The plans and working drawings shall be submitted at least 7 days before the Contractor intends to begin the work involved.

Unless otherwise specified, the following substitutions of materials and products will be allowed:

SUBSTITUTION TABLE FOR SIZES OF HIGH STRENGTH STEEL FASTENERS

ASTM Designation: A 325M

| METRIC SIZE SHOWN ON THE PLANS mm x thread pitch | SIZE TO BE SUBSTITUTED inch |
|---|--------------------------------|
| M16 x 2 | 5/8 |
| M20 x 2.5 | 3/4 |
| M22 x 2.5 | 7/8 |
| M24 x 3 | 1 |
| M27 x 3 | 1-1/8 |
| M30 x 3.5 | 1-1/4 |
| M36 x 4 | 1-1/2 |

SUBSTITUTION TABLE FOR PLAIN WIRE REINFORCEMENT

ASTM Designation: A 82

| METRIC SIZE SHOWN ON THE PLANS mm ² | SIZE TO BE SUBSTITUTED inch ² x 100 |
|---|---|
| MW9 | W1.4 |
| MW10 | W1.6 |
| MW13 | W2.0 |
| MW15 | W2.3 |
| MW19 | W2.9 |
| MW20 | W3.1 |
| MW22 | W3.5 |
| MW25 | W3.9, except W3.5 in piles only |
| MW26 | W4.0 |
| MW30 | W4.7 |
| MW32 | W5.0 |
| MW35 | W5.4 |
| MW40 | W6.2 |
| MW45 | W6.5 |
| MW50 | W7.8 |
| MW55 | W8.5, except W8.0 in piles only |
| MW60 | W9.3 |
| MW70 | W10.9, except W11.0 in piles only |
| MW80 | W12.4 |
| MW90 | W14.0 |
| MW100 | W15.5 |

SUBSTITUTION TABLE FOR BAR REINFORCEMENT

| METRIC BAR DESIGNATION NUMBER ¹ SHOWN ON THE PLANS | BAR DESIGNATION NUMBER ² TO BE SUBSTITUTED |
|--|--|
| 10 | 3 |
| 13 | 4 |
| 16 | 5 |
| 19 | 6 |
| 22 | 7 |
| 25 | 8 |
| 29 | 9 |
| 32 | 10 |
| 36 | 11 |
| 43 | 14 |
| 57 | 18 |

¹Bar designation numbers approximate the number of millimeters of the nominal diameter of the bars.

²Bar numbers are based on the number of eighths of an inch included in the nominal diameter of the bars.

No adjustment will be required in spacing or total number of reinforcing bars due to a difference in minimum yield strength between metric and non-metric bars.

SUBSTITUTION TABLE FOR SIZES OF:

(1) STEEL FASTENERS FOR GENERAL APPLICATIONS (ASTM Designation: A 307 or AASHTO Designation: M 314, Grade 36 or 55), and

(2) HIGH STRENGTH STEEL FASTENERS (ASTM Designation: A 325 or A 449)

| METRIC SIZE SHOWN ON THE PLANS mm | SIZE TO BE SUBSTITUTED inch |
|--------------------------------------|--------------------------------|
| 6 or 6.35 | 1/4 |
| 8 or 7.94 | 5/16 |
| 10 or 9.52 | 3/8 |
| 11 or 11.11 | 7/16 |
| 13 or 12.70 | 1/2 |
| 14 or 14.29 | 9/16 |
| 16 or 15.88 | 5/8 |
| 19 or 19.05 | 3/4 |
| 22 or 22.22 | 7/8 |
| 24, 25, or 25.40 | 1 |
| 29 or 28.58 | 1-1/8 |
| 32 or 31.75 | 1-1/4 |
| 35 or 34.93 | 1-3/8 |
| 38 or 38.10 | 1-1/2 |
| 44 or 44.45 | 1-3/4 |
| 51 or 50.80 | 2 |
| 57 or 57.15 | 2-1/4 |
| 64 or 63.50 | 2-1/2 |
| 70 or 69.85 | 2-3/4 |
| 76 or 76.20 | 3 |
| 83 or 82.55 | 3-1/4 |
| 89 or 88.90 | 3-1/2 |
| 95 or 95.25 | 3-3/4 |
| 102 or 101.60 | 4 |

SUBSTITUTION TABLE FOR NOMINAL THICKNESS OF SHEET METAL

| UNCOATED HOT AND COLD ROLLED SHEETS | | HOT-DIPPED ZINC COATED SHEETS (GALVANIZED) | |
|--|-----------------------------------|---|-----------------------------------|
| METRIC THICKNESS SHOWN ON THE PLANS mm | GAGE TO BE SUBSTITUTED inch | METRIC THICKNESS SHOWN ON THE PLANS mm | GAGE TO BE SUBSTITUTED inch |
| 7.94 | 0.3125 | 4.270 | 0.1681 |
| 6.07 | 0.2391 | 3.891 | 0.1532 |
| 5.69 | 0.2242 | 3.510 | 0.1382 |
| 5.31 | 0.2092 | 3.132 | 0.1233 |
| 4.94 | 0.1943 | 2.753 | 0.1084 |
| 4.55 | 0.1793 | 2.372 | 0.0934 |
| 4.18 | 0.1644 | 1.994 | 0.0785 |
| 3.80 | 0.1495 | 1.803 | 0.0710 |
| 3.42 | 0.1345 | 1.613 | 0.0635 |
| 3.04 | 0.1196 | 1.461 | 0.0575 |
| 2.66 | 0.1046 | 1.311 | 0.0516 |
| 2.28 | 0.0897 | 1.158 | 0.0456 |
| 1.90 | 0.0747 | 1.006 or 1.016 | 0.0396 |
| 1.71 | 0.0673 | 0.930 | 0.0366 |
| 1.52 | 0.0598 | 0.853 | 0.0336 |
| 1.37 | 0.0538 | 0.777 | 0.0306 |
| 1.21 | 0.0478 | 0.701 | 0.0276 |
| 1.06 | 0.0418 | 0.627 | 0.0247 |
| 0.91 | 0.0359 | 0.551 | 0.0217 |
| 0.84 | 0.0329 | 0.513 | 0.0202 |
| 0.76 | 0.0299 | 0.475 | 0.0187 |
| 0.68 | 0.0269 | ----- | ----- |
| 0.61 | 0.0239 | ----- | ----- |
| 0.53 | 0.0209 | ----- | ----- |
| 0.45 | 0.0179 | ----- | ----- |
| 0.42 | 0.0164 | ----- | ----- |
| 0.38 | 0.0149 | ----- | ----- |

SUBSTITUTION TABLE FOR WIRE

| METRIC THICKNESS SHOWN ON THE PLANS mm | WIRE THICKNESS TO BE SUBSTITUTED inch | GAGE NO. |
|---|--|-----------------|
| 6.20 | 0.244 | 3 |
| 5.72 | 0.225 | 4 |
| 5.26 | 0.207 | 5 |
| 4.88 | 0.192 | 6 |
| 4.50 | 0.177 | 7 |
| 4.11 | 0.162 | 8 |
| 3.76 | 0.148 | 9 |
| 3.43 | 0.135 | 10 |
| 3.05 | 0.120 | 11 |
| 2.69 | 0.106 | 12 |
| 2.34 | 0.092 | 13 |
| 2.03 | 0.080 | 14 |
| 1.83 | 0.072 | 15 |
| 1.57 | 0.062 | 16 |
| 1.37 | 0.054 | 17 |
| 1.22 | 0.048 | 18 |
| 1.04 | 0.041 | 19 |
| 0.89 | 0.035 | 20 |

SUBSTITUTION TABLE FOR PIPE PILES

| METRIC SIZE SHOWN ON THE PLANS mm x mm | SIZE TO BE SUBSTITUTED inch x inch |
|---|---|
| PP 360 x 4.55 | NPS 14 x 0.179 |
| PP 360 x 6.35 | NPS 14 x 0.250 |
| PP 360 x 9.53 | NPS 14 x 0.375 |
| PP 360 x 11.12 | NPS 14 x 0.438 |
| PP 406 x 12.70 | NPS 16 x 0.500 |
| PP 460 x T | NPS 18 x T" |
| PP 508 x T | NPS 20 x T" |
| PP 559 x T | NPS 22 x T" |
| PP 610 x T | NPS 24 x T" |
| PP 660 x T | NPS 26 x T" |
| PP 711 x T | NPS 28 x T" |
| PP 762 x T | NPS 30 x T" |
| PP 813 x T | NPS 32 x T" |
| PP 864 x T | NPS 34 x T" |
| PP 914 x T | NPS 36 x T" |
| PP 965 x T | NPS 38 x T" |
| PP 1016 x T | NPS 40 x T" |
| PP 1067 x T | NPS 42 x T" |
| PP 1118 x T | NPS 44 x T" |
| PP 1219 x T | NPS 48 x T" |
| PP 1524 x T | NPS 60 x T" |

The thickness in millimeters (T) represents an exact conversion of the thickness in inches (T").

SUBSTITUTION TABLE FOR STRUCTURAL TIMBER AND LUMBER

| METRIC MINIMUM DRESSED DRY, SHOWN ON THE PLANS mm x mm | METRIC MINIMUM DRESSED GREEN, SHOWN ON THE PLANS mm x mm | NOMINAL SIZE TO BE SUBSTITUTED inch x inch |
|---|---|---|
| 19x89 | 20x90 | 1x4 |
| 38x89 | 40x90 | 2x4 |
| 64x89 | 65x90 | 3x4 |
| 89x89 | 90x90 | 4x4 |
| 140x140 | 143x143 | 6x6 |
| 140x184 | 143x190 | 6x8 |
| 184x184 | 190x190 | 8x8 |
| 235x235 | 241x241 | 10x10 |
| 286x286 | 292x292 | 12x12 |

SUBSTITUTION TABLE FOR NAILS AND SPIKES

| METRIC COMMON NAIL, SHOWN ON THE PLANS Length, mm Diameter, mm | METRIC BOX NAIL, SHOWN ON THE PLANS Length, mm Diameter, mm | METRIC SPIKE, SHOWN ON THE PLANS Length, mm Diameter, mm | SIZE TO BE SUBSTITUTED Penny-weight |
|--|---|---|--|
| 50.80 2.87 | 50.80 2.51 | ———— | 6d |
| 63.50 3.33 | 63.50 2.87 | ———— | 8d |
| 76.20 3.76 | 76.20 3.25 | 76.20 4.88 | 10d |
| 82.55 3.76 | 82.55 3.25 | 82.55 4.88 | 12d |
| 88.90 4.11 | 88.90 3.43 | 88.90 5.26 | 16d |
| 101.60 4.88 | 101.60 3.76 | 101.60 5.72 | 20d |
| 114.30 5.26 | 114.30 3.76 | 114.30 6.20 | 30d |
| 127.00 5.72 | 127.00 4.11 | 127.00 6.68 | 40d |
| ———— | ———— | 139.70 7.19 | 50d |
| ———— | ———— | 152.40 7.19 | 60d |

**SUBSTITUTION TABLE FOR IRRIGATION
COMPONENTS**

| METRIC WATER METERS, TRUCK LOADING STANDPIPES, VALVES, BACKFLOW PREVENTERS, FLOW SENSORS, WYE STRAINERS, FILTER ASSEMBLY UNITS, PIPE SUPPLY LINES, AND PIPE IRRIGATION SUPPLY LINES SHOWN ON THE PLANS DIAMETER NOMINAL (DN) mm | NOMINAL SIZE TO BE SUBSTITUTED inch |
|--|--|
| 15 | 1/2 |
| 20 | 3/4 |
| 25 | 1 |
| 32 | 1-1/4 |
| 40 | 1-1/2 |
| 50 | 2 |
| 65 | 2-1/2 |
| 75 | 3 |
| 100 | 4 |
| 150 | 6 |
| 200 | 8 |
| 250 | 10 |
| 300 | 12 |
| 350 | 14 |
| 400 | 16 |

Unless otherwise specified, substitutions of United States Standard Measures standard structural shapes corresponding to the metric designations shown on the plans and in conformance with the requirements in ASTM Designation: A 6/A 6M, Annex 2, will be allowed.

SECTION 8-2. CONCRETE

8-2.01 PORTLAND CEMENT CONCRETE

Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

References to Section 90-2.01, "Portland Cement," of the Standard Specifications shall mean Section 90-2.01, "Cement," of the Standard Specifications.

Mineral admixture shall be combined with cement in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures," of the Standard Specifications for the concrete materials specified in Section 56-2, "Roadside Signs," of the Standard Specifications.

The requirements of Section 90-4.08, "Required Use of Mineral Admixture," of the Standard Specifications shall not apply to Section 19-3.025C, "Soil Cement Bedding," of the Standard Specifications.

The Contractor will be permitted to use Type III portland cement for concrete used in the manufacture of precast concrete members.

SECTION 9. (BLANK)
SECTION 10. CONSTRUCTION DETAILS
SECTION 10-1. GENERAL

10-1.01 ORDER OF WORK

Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the Standard Specifications and these special provisions.

The Contractor shall construct the temporary fence around environmentally sensitive areas (ESA), as shown on the plans and in conformance with "Temporary Fence (Type ESA)" and "Environmentally Sensitive Areas", of these special provisions prior to beginning any work.

The first order of work shall be to provide the Engineer a cost breakdown for the High Speed Weigh-In-Motion System for approval within 15 working days after the contract has been approved. The cost breakdown shall be approved by the Engineer, in writing, before any partial payments for the items of work will be made. Attention is directed to "Cost Breakdown" elsewhere in these special provisions.

Asphalt Concrete for maintenance vehicle pullout shall not be placed until pull boxes, conduits and 50 mm drain pipe have been installed.

10-1.02 WATER POLLUTION CONTROL

Water pollution control work shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications and these special provisions.

Water pollution control work shall conform to the requirements in the "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual" and the "Construction Site Best Management Practices (BMPs) Manual," and addenda thereto issued up to, and including, the date of advertisement of the project, hereafter referred to respectively as the "Preparation Manual" and the "Construction Site BMP Manual" and collectively as the "Manuals." Copies of the Manuals may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520. Copies of the Manuals may also be obtained from the Department's Internet Web Site at: <http://www.dot.ca.gov/hq/construc/stormwater.html>.

Copies of the Manuals are also available for review at the Northern Region Construction Office at 379-A Colusa Highway, Yuba City, California 95991.

The Contractor shall know and fully comply with the applicable provisions of the Manuals and Federal, State, and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction.

Unless arrangements for disturbance of areas outside the project limits are made by the Department and made part of the contract, it is expressly agreed that the Department assumes no responsibility whatsoever to the Contractor or property owner with respect to any arrangements made between the Contractor and property owner to allow disturbance of areas outside the project limits.

The Contractor shall be responsible for the costs and for liabilities imposed by law as a result of the Contractor's failure to comply with the requirements set forth in this section "Water Pollution Control" including, but not limited to, compliance with the applicable provisions of the Manuals and Federal, State, and local regulations. For the purposes of this paragraph, costs and liabilities include, but are not limited to, fines, penalties, and damages whether assessed against the State or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.

In addition to the remedies authorized by law, an amount of the money due the Contractor under the contract, as determined by the Department, may be retained by the State of California until disposition has been made of the costs and liabilities.

The retention of money due the Contractor shall be subject to the following:

- A. The Department will give the Contractor 30 days notice of the Department's intention to retain funds from partial payments which may become due to the Contractor prior to acceptance of the contract. Retention of funds from payments made after acceptance of the contract may be made without prior notice to the Contractor.
- B. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications.
- C. If the Department has retained funds and it is subsequently determined that the State is not subject to the costs and liabilities in connection with the matter for which the retention was made, the Department shall be liable for interest on the amount retained at the legal rate of interest for the period of the retention.

Conformance with the provisions in this section "Water Pollution Control" shall not relieve the Contractor from the Contractor's responsibilities as provided in Section 7, "Legal Relations and Responsibilities," of the Standard Specifications.

WATER POLLUTION CONTROL PROGRAM PREPARATION, APPROVAL AND UPDATES

As part of the water pollution control work, a Water Pollution Control Program, hereafter referred to as the "WPCP," is required for this contract. The WPCP shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications, the requirements in the Manuals, and these special provisions.

No work having potential to cause water pollution, as determined by the Engineer, shall be performed until the WPCP has been approved by the Engineer.

Within 15 days after the approval of the contract, the Contractor shall submit 3 copies of the WPCP to the Engineer. The Engineer will have 7 days to review the WPCP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the WPCP within 7 days of receipt of the Engineer's comments. The Engineer will have 3 days to review the revisions. Upon the Engineer's approval of the WPCP, 3 additional copies of the WPCP incorporating the required changes shall be submitted to the Engineer. Minor changes or clarifications to the initial submittal may be made and attached as amendments to the WPCP. In order to allow construction activities to proceed, the Engineer may conditionally approve the WPCP while minor revisions or amendments are being completed.

The WPCP shall identify pollution sources that may adversely affect the quality of storm water discharges associated with the project and shall identify water pollution control measures, hereafter referred to as control measures, to be constructed, implemented, and maintained in order to reduce to the extent feasible pollutants in storm water discharges from the construction site during construction under this contract.

The WPCP shall incorporate control measures in the following categories:

- A. Soil stabilization;
- B. Sediment control;
- C. Tracking control;
- D. Wind erosion control;
- E. Non-storm water control; and
- F. Waste management and material pollution control.

Specific objectives and minimum requirements for each category of control measures are contained in the Manuals.

The Contractor shall consider the objectives and minimum requirements presented in the Manuals for each of the above categories. When minimum requirements are listed for any category, the Contractor shall incorporate into the WPCP and implement on the project, one or more of the listed minimum controls required in order to meet the pollution control objectives for the category. In addition, the Contractor shall consider other control measures presented in the Manuals and shall incorporate into the WPCP and implement on the project the control measures necessary to meet the objectives of the WPCP. The Contractor shall document the selection process in conformance with the procedure specified in the Manuals.

The WPCP shall include, but not be limited to, the following items as described in the Preparation Manual:

- A. Project description and Contractor's certification;
- B. Project information;
- C. Pollution sources, control measures, and water pollution control drawings; and
- D. Amendments, if any.

The Contractor shall amend the WPCP, graphically and in narrative form, whenever there is a change in construction activities or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, municipal storm drain systems or when deemed necessary by the Engineer. The WPCP shall be amended if the WPCP has not achieved the objective of reducing pollutants in storm water discharges. Amendments shall show additional control measures or revised operations, including those in areas not shown in the initially approved WPCP, which are required on the project to control water pollution effectively. Amendments to the WPCP shall be submitted for review and approval by the Engineer in the same manner specified for the initially approved WPCP. Amendments shall be dated and attached to the on-site WPCP document.

The Contractor shall keep a copy of the WPCP, together with updates, revisions and amendments at the project site.

WPCP IMPLEMENTATION

Upon approval of the WPCP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting, and maintaining the control measures included in the WPCP and any amendments thereto and for removing and disposing of temporary control measures. Unless otherwise directed by the Engineer or specified in these special provisions, the Contractor's responsibility for WPCP implementation shall continue throughout any temporary

suspension of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. Requirements for installation, construction, inspection, maintenance, removal, and disposal of control measures are specified in the Manuals and these special provisions.

Soil stabilization practices and sediment control measures, including minimum requirements, shall be provided throughout the rainy season, defined as between October 15th and April 15th.

Implementation of soil stabilization practices and sediment control measures for soil-disturbed areas on the project site shall be completed, except as provided for below, not later than 20 days prior to the beginning of the rainy season or upon start of applicable construction activities for projects which begin either during or within 20 days of the rainy season.

Throughout the rainy season, the active, soil-disturbed area of the project site shall be not more than 1.9 hectares. The Engineer may approve, on a case-by-case basis, expansions of the active, soil-disturbed area limit. The Contractor shall demonstrate the ability and preparedness to fully deploy soil stabilization practices and sediment control measures to protect soil-disturbed areas on the project site before the onset of precipitation. A quantity of soil stabilization and sediment control materials shall be maintained on site equal to 100 percent of that sufficient to protect unprotected, soil-disturbed areas on the project site. A detailed plan for the mobilization of sufficient labor and equipment shall be maintained to fully deploy control measures required to protect unprotected, soil-disturbed areas on the project site prior to the onset of precipitation. A current inventory of control measure materials and the detailed mobilization plan shall be included as part of the WPCP.

Throughout the rainy season, soil-disturbed areas on the project site shall be considered to be nonactive whenever soil disturbing activities are expected to be discontinued for a period of 20 or more days and the areas are fully protected. Areas that will become nonactive either during the rainy season or within 20 days thereof shall be fully protected with soil stabilization practices and sediment control measures within 10 days of the discontinuance of soil disturbing activities or prior to the onset of precipitation, whichever is first to occur.

Throughout the rainy season, active soil-disturbed areas of the project site shall be fully protected at the end of each day with soil stabilization practices and sediment control measures unless fair weather is predicted through the following work day. The weather forecast shall be monitored by the Contractor on a daily basis. The National Weather Service forecast shall be used. An alternative weather forecast proposed by the Contractor may be used if approved by the Engineer. If precipitation is predicted prior to the end of the following work day, construction scheduling shall be modified, as required, and functioning control measures shall be deployed prior to the onset of the precipitation.

The Contractor shall implement, year-round and throughout the duration of the project, control measures included in the WPCP for tracking control, wind erosion control, non-storm water control, and waste management and material pollution control.

The Engineer may order the suspension of construction operations which create water pollution if the Contractor fails to conform to the provisions in this section "Water Pollution Control" as determined by the Engineer.

MAINTENANCE

To ensure the proper implementation and functioning of control measures, the Contractor shall regularly inspect and maintain the construction site for the control measures identified in the WPCP. The Contractor shall identify corrective actions and time needed to address any deficient measures or reinitiate any measures that have been discontinued.

The construction site inspection checklist provided in the Preparation Manual shall be used to ensure that the necessary measures are being properly implemented, and to ensure that the control measures are functioning adequately. One copy of each site inspection record shall be submitted to the Engineer.

During the rainy season, inspections of the construction site shall be conducted by the Contractor to identify deficient measures, as follows:

- A. Prior to a forecast storm;
- B. After all precipitation which causes runoff capable of carrying sediment from the construction site;
- C. At 24-hour intervals during extended precipitation events; and
- D. Routinely, at a minimum of once every 2 weeks.

If the Contractor or the Engineer identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected immediately. The deficiency may be corrected at a later date and time if requested by the Contractor and approved by the Engineer in writing, but not later than the onset of subsequent precipitation events. The correction of deficiencies shall be at no additional cost to the State.

PAYMENT

Full compensation for conforming to the provisions in this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

Those control measures for which there is a contract item of work will be measured and paid for as that contract item of work.

The Engineer will retain an amount equal to 25 percent of the estimated value of the contract work performed during estimate periods in which the Contractor fails to conform to the provisions in this section "Water Pollution Control" as determined by the Engineer.

Retentions for failure to conform to the provisions in this section "Water Pollution Control" shall be in addition to the other retentions provided for in the contract. The amounts retained for failure of the Contractor to conform to the provisions in this section will be released for payment on the next monthly estimate for partial payment following the date that a WPCP has been implemented and maintained and water pollution is adequately controlled, as determined by the Engineer.

10-1.03 TEMPORARY FENCE (TYPE ESA)

Temporary fence (Type ESA) shall be furnished, constructed, maintained, and later removed as shown on the plans, as specified in these special provisions and as directed by the Engineer.

The exact location of the temporary fencing will be determined by the Engineer.

Temporary fence (Type ESA) shall be used and located so that it will be obvious to heavy equipment operators. The boundary fencing shall be checked periodically and repaired or replaced as necessary during construction.

Materials may be commercial quality provided the dimensions and sizes of the materials are equal to, or greater than, the dimensions and sizes shown on the plans or specified herein.

The fabric shall conform to the following requirements:

| | |
|------------------------|-------------------|
| Material | Polypropylene |
| Color | Orange |
| Opening size | 50.8 mm x 50.8 mm |
| Ultraviolet Resistance | Fully Stabilized |
| Minimum Fabric Width | 1.22 mm |
| Height | 1.2 m |

Posts shall be either metal or wood at the Contractor's option and shall be suitable for the purpose intended. Post spacing shall be adequate to completely support the fence in an upright position.

Treating wood with a wood preservative will not be required.

Concrete footings for wood posts will not be required.

Temporary fence that is damaged during the progress of the work shall be repaired or replaced by the Contractor at the Contractor's expense.

When no longer required for the work, as determined by the Engineer, temporary fence shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Holes caused by the removal of temporary fence shall be backfilled in conformance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

The contract price paid per meter for temporary fence (Type ESA) shall include full compensation for furnishing, installing, maintaining, replacing, removing and disposing of all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in temporary fence (Type ESA), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.04 PROGRESS SCHEDULE

Progress schedules are required for this contract and shall be submitted in conformance with the provisions in Section 8-1.04, "Progress Schedule," of the Standard Specifications and these special provisions, unless otherwise authorized in writing by the Engineer.

The second paragraph of Section 8-1.04, "Progress Schedule," of the Standard Specifications shall not apply.

10-1.05 OBSTRUCTIONS

Attention is directed to Section 8-1.10, "Utility and Non-Highway Facilities," and Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include, but are not limited to, the following:

| Notification Center | Telephone Number |
|---|----------------------------------|
| Underground Service Alert-Northern California (USA) | 1-800-642-2444 1-800-227-2600 |
| Underground Service Alert-Southern California (USA) | 1-800-422-4133 1-800-227-2600 |

10-1.06 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications.

10-1.07 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES

Flagging, signs, and all other traffic control devices furnished, installed, maintained, and removed when no longer required shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Category 1 traffic control devices are defined as those devices that are small and lightweight (less than 45 kg), and have been in common use for many years. The devices shall be known to be crashworthy by crash testing, crash testing of similar devices, or years of demonstrable safe performance. Category 1 traffic control devices include traffic cones, plastic drums, portable delineators, and channelizers.

If requested by the Engineer, the Contractor shall provide written self-certification for crashworthiness of Category 1 traffic control devices. Self-certification shall be provided by the manufacturer or Contractor and shall include the following: date, Federal Aid number (if applicable), expenditure authorization, district, county, route and kilometer post of project limits; company name of certifying vendor, street address, city, state and zip code; printed name, signature and title of certifying person; and an indication of which Category 1 traffic control devices will be used on the project. The Contractor may obtain a standard form for self-certification from the Engineer.

Category 2 traffic control devices are defined as those items that are small and lightweight (less than 45 kg), that are not expected to produce significant vehicular velocity change, but may otherwise be potentially hazardous. Category 2 traffic control devices include: barricades and portable sign supports.

Category 2 devices purchased on or after October 1, 2000 shall be on the Federal Highway Administration (FHWA) Acceptable Crashworthy Category 2 Hardware for Work Zones list. This list is maintained by FHWA and can be located at the following internet address: <http://safety.fhwa.dot.gov/fourthlevel/hardware/listing.cfm?code=workzone>. The Department maintains a secondary list at the following internet address: <http://www.dot.ca.gov/hq/traffops/signtech/signdel/pdf/files.htm>.

Category 2 devices that have not received FHWA acceptance, and were purchased before October 1, 2000, may continue to be used until they complete their useful service life or until January 1, 2003, whichever comes first. Category 2 devices in use that have received FHWA acceptance shall be labeled with the FHWA acceptance letter number and the name of the manufacturer by the start of the project. The label shall be readable. After January 1, 2003, all Category 2 devices without a label shall not be used on the project.

Full compensation for providing self-certification for crashworthiness of Category 1 traffic control devices and labeling Category 2 devices as specified shall be considered as included in the prices paid for the various contract items of work requiring the use of the Category 1 or Category 2 traffic control devices and no additional compensation will be allowed therefor.

10-1.08 CONSTRUCTION AREA SIGNS

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Type II retroreflective sheeting shall not be used on construction area sign panels.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to commencing excavation for construction area sign posts. The regional notification centers include, but are not limited to, the following:

| Notification Center | Telephone Number |
|---|----------------------------------|
| Underground Service Alert-Northern California (USA) | 1-800-642-2444 1-800-227-2600 |
| Underground Service Alert-Southern California (USA) | 1-800-422-4133 1-800-227-2600 |

Excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes.

Sign substrates for stationary mounted construction area signs may be fabricated from fiberglass reinforced plastic as specified under "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

10-1.09 MAINTAINING TRAFFIC

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to the provisions in "Public Safety" and "Portable Changeable Message Sign", of these special provisions and these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7-1.09.

Lane closures shall conform to the provisions in section "Traffic Control System for Lane Closure" of these special provisions.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders including any section closed to public traffic.

Whenever vehicles or equipment are parked on the shoulder within 1.8 m of a traffic lane, the shoulder area shall be closed as shown on the plans.

Lanes shall be closed only during the hours shown on the charts included in this section "Maintaining Traffic." Except work required under Sections 7-1.08 and 7-1.09, work that interferes with public traffic shall be performed only during the hours shown for lane closures.

Designated legal holidays are: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, and December 25th. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor, if in the opinion of the Engineer, public traffic will be better served and the work expedited. These deviations shall not be adopted by the Contractor until the Engineer has approved the deviations in writing. All other modifications will be made by contract change order.

| Chart No. 1 Multilane Lane Requirements | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|------|--------------------------------------|---|---|---|---|---|---|---|---|----|----|-------------------------|---|---|---|---|---|---|---|---|---|----|----|----|
| Direction: NORTHBOUND | | | | | | | | | | | | | Location: 03-SAC-5-53.4 | | | | | | | | | | | | |
| FROM HOUR TO HOUR | a.m. | | | | | | | | | | | | p.m. | | | | | | | | | | | | |
| | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Mondays through Thursdays | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | 1 | 1 | 1 | |
| Fridays | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | | |
| Saturdays | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | |
| Sundays | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | |
| Day before designated legal holiday and designated legal holidays | | | | | | | | | | | | | | | | | | | | | | | | | |
| Legend: | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | One lane open in direction of travel | | | | | | | | | | | | | | | | | | | | | | | |
| | | No lane closure allowed | | | | | | | | | | | | | | | | | | | | | | | |
| REMARKS: | | | | | | | | | | | | | | | | | | | | | | | | | |

| Chart No. 2 Multilane Lane Requirements | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|---|---|---|---|---|---|---|---|---|----|----|-------------------------|---|---|---|---|---|---|---|---|---|----|----|----|
| Direction: SOUTHBOUND | | | | | | | | | | | | | Location: 03-SAC-5-53.4 | | | | | | | | | | | | |
| FROM HOUR TO HOUR | a.m. | | | | | | | | | | | | p.m. | | | | | | | | | | | | |
| | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Mondays through Thursdays | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | 1 | 1 | |
| Fridays | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | |
| Saturdays | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | |
| Sundays | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Day before designated legal holiday and designated legal holidays | | | | | | | | | | | | | | | | | | | | | | | | | |
| Legend: | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | One lane open in direction of travel | | | | | | | | | | | | | | | | | | | | | | | | |
| | No lane closure allowed | | | | | | | | | | | | | | | | | | | | | | | | |
| REMARKS: | | | | | | | | | | | | | | | | | | | | | | | | | |

| Chart No. 3 Multilane Lane Requirements | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|---|---|---|---|---|---|---|---|---|----|----|--------------------------|---|---|---|---|---|---|---|---|---|----|----|----|
| Direction: NORTHBOUND | | | | | | | | | | | | | Location: 03-SAC-99-55.5 | | | | | | | | | | | | |
| FROM HOUR TO HOUR | a.m. | | | | | | | | | | | | p.m. | | | | | | | | | | | | |
| | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Mondays through Thursdays | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | 1 | 1 | 1 | 1 | 1 | |
| Fridays | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | |
| Saturdays | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | |
| Sundays | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 | |
| Day before designated legal holiday and designated legal holidays | | | | | | | | | | | | | | | | | | | | | | | | | |
| Legend: | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | One lane open in direction of travel | | | | | | | | | | | | | | | | | | | | | | | | |
| | No lane closure allowed | | | | | | | | | | | | | | | | | | | | | | | | |
| REMARKS: | | | | | | | | | | | | | | | | | | | | | | | | | |

| Chart No. 4 Multilane Lane Requirements | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|------|---|---|---|---|---|---|---|---|---|----|--------------------------|------|---|---|---|---|---|---|---|---|---|----|----|----|
| Direction: SOUTHBOUND | | | | | | | | | | | | Location: 03-SAC-99-55.5 | | | | | | | | | | | | | |
| FROM HOUR TO HOUR | a.m. | | | | | | | | | | | | p.m. | | | | | | | | | | | | |
| | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Mondays through Thursdays | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Fridays | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | |
| Saturdays | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | |
| Sundays | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1 | 1 |
| Day before designated legal holiday and designated legal holidays | | | | | | | | | | | | | | | | | | | | | | | | | |
| Legend: <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; margin-right: 5px;"></div> <div>One lane open in direction of travel</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="border: 1px solid black; width: 20px; height: 15px; margin-right: 5px;"></div> <div>No lane closure allowed</div> </div> | | | | | | | | | | | | | | | | | | | | | | | | | |
| REMARKS: | | | | | | | | | | | | | | | | | | | | | | | | | |

10-1.10 CLOSURE REQUIREMENTS AND CONDITIONS

Lane closures shall conform to the provisions in "Maintaining Traffic" of these special provisions and these special provisions.

The term closure, as used herein, is defined as the closure of a traffic lane or lanes, including ramp or connector lanes, within a single traffic control system.

CLOSURE SCHEDULE

By noon Monday, the Contractor shall submit a written schedule of planned closures for the following week period, defined as Friday noon through the following Friday noon.

The Closure Schedule shall show the locations and times when the proposed closures are to be in effect. The Contractor shall use the Closure Schedule request forms furnished by the Engineer. Closure Schedules submitted to the Engineer with incomplete, unintelligible or inaccurate information will be returned for correction and resubmittal. The Contractor will be notified of disapproved closures or closures that require coordination with other parties as a condition of approval.

Amendments to the Closure Schedule, including adding additional closures, shall be submitted to the Engineer, in writing, at least 3 working days in advance of a planned closure. Approval of amendments to the Closure Schedule will be at the discretion of the Engineer.

The Contractor shall confirm, in writing, all scheduled closures by no later than 8:00 a.m. 3 working days prior to the date on which the closure is to be made. Approval or denial of scheduled closures will be made no later than 4:00 p.m. 2 working days prior to the date on which the closure is to be made. Closures not confirmed or approved will not be allowed.

Confirmed closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of the Engineer for the following working day.

CONTINGENCY PLAN

The Contractor shall prepare a contingency plan for reopening closures to public traffic. The Contractor shall submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request.

LATE REOPENING OF CLOSURES

If a closure is not reopened to public traffic by the specified time, work shall be suspended in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. The Contractor shall not make any further closures until the Engineer has accepted a work plan, submitted by the Contractor, that will insure that future closures will be reopened to public traffic at the specified time. The Engineer will have 2 working days to accept or reject the Contractor's proposed work plan. The Contractor will not be entitled to any compensation for the suspension of work resulting from the late reopening of closures.

On Route 5, for each 15-minute interval, or fraction thereof past the time specified to reopen the closure, the Department will deduct \$1,800.00 per interval from moneys due or that may become due the Contractor under the contract.

COMPENSATION

The Contractor shall notify the Engineer of any delay in the Contractor's operations due to the following conditions, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of those conditions, and the Contractor's loss due to that delay could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment and plant, the delay will be considered a right of way delay within the meaning of Section 8-1.09, "Right of Way Delays," and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09:

- A. The Contractor's proposed Closure Schedule is denied and his planned closures are within the time frame allowed for closures in "Maintaining Traffic" of these special provisions, except that the Contractor will not be entitled to any compensation for amendments to the Closure Schedule that are not approved.
- B. The Contractor is denied a confirmed closure.

Should the Engineer direct the Contractor to remove a closure prior to the time designated in the approved Closure Schedule, any delay to the Contractor's schedule due to removal of the closure will be considered a right of way delay within the meaning of Section 8-1.09, "Right of Way Delays," and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09.

10-1.11 CONSTRUCTION ZONE ENHANCED ENFORCEMENT

Construction zone enhanced enforcement will be provided by the State as directed by the Engineer and in conformance with these special provisions. Construction zone enhanced enforcement shall consist of the presence of the California Highway Patrol (CHP) within and near the limits of construction during specified stages of work to control the movement of public traffic within the work zone. A total of 270 hours of California Highway Patrol support is available.

Construction zone enhanced enforcement will be required during the performance of the work.

The Contractor shall submit a schedule to the Engineer at least 15 days prior to the performance of work requiring construction zone enhanced enforcement. The schedule shall include all activities requiring construction zone enhanced enforcement and the estimated hours of CHP support required for each activity. The work shall be performed within the number of hours allocated for CHP support.

The Contractor may request additional CHP support for other times and in support of other work activities. The Contractor shall bear the costs and expenses for additional CHP support. The CHP shall be compensated at an agreed rate of \$55.00 per hour per CHP Officer. The agreed rate shall be considered full compensation for each hour, or portion thereof, that a CHP Officer is performing construction area enhanced enforcement. There will be no markup applied to any expenses connected with CHP support. The costs and expenses for requested additional CHP support will be deducted from moneys due to the Contractor.

The Engineer shall make all arrangements with the CHP for scheduled and requested additional construction zone enhanced enforcement.

CHP support shall be scheduled in compliance with the provisions in "Closure Requirements and Conditions" of these special provisions. The Contractor will be notified in writing of assigned CHP support when the Contractor is informed of the approval of requested closures.

Cancellations to previously approved closures scheduled to include construction zone enhancement enforcement shall be submitted in writing to the Engineer at least 36 hours prior to the time when the closure is to be in place. Written notices of cancellation for a closure shall be delivered to the Engineer between the hours of 7:00 a.m. and 3:00 p.m., Monday through Friday, excluding designated legal holidays.

Cancellations with less than the 36-hour written notice may result in charges from the CHP. The Contractor shall bear any costs and expenses resulting from cancellations with less than the 36 hour written notice, except cancellations due to weather or circumstances beyond the control of the Contractor, as determined by the Engineer. The CHP shall be compensated not less than \$50.00 per hour and no greater than 4 hours of overtime pay per CHP Officer scheduled to participate in the construction zone enhancement enforcement that is cancelled. The costs and expenses incurred for late cancellations will be deducted from moneys due or that may become due the Contractor.

The presence of the California Highway Patrol will not relieve the Contractor of responsibility of providing for the safety of the public in conformance with the requirements in Section 7-1.09, "Public Safety," nor relieve the Contractor from the responsibility for damage in conformance with the requirements in Section 7-1.12, "Responsibility for Damage," of the Standard Specifications.

10-1.12 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes in conformance with the details shown on the plans, the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" of these special provisions, and these special provisions.

The provisions in this section will not relieve the Contractor from the responsibility to provide additional devices or take measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining or removing components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining or removing components when operated within a stationary lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on vehicles which are being used to place, maintain and remove components of a traffic control system and shall be in place before a lane closure requiring its use is completed.

The traffic cones shown to be placed transversely across closed traffic lanes and shoulders on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be placed.

If components in the traffic control system are displaced or cease to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the components to the original condition or replace the components and shall restore the components to the original location.

When lane closures are made for work periods only, at the end of each work period, components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations designated by the Engineer within the limits of the highway right of way.

The contract lump sum price paid for traffic control system shall include full compensation for furnishing all labor, materials (including signs), tools, equipment, and incidentals (including cellular phones and radios), and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing, and disposing of the components of the traffic control system shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications shall not apply to the item of traffic control system. Adjustments in compensation for traffic control system will be made only for increased or decreased traffic control system required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased traffic control necessary. The adjustment will be made on a force account basis as provided in Section 9-1.03, "Force Account Payment," of the Standard Specifications for increased work and estimated on the same basis in the case of decreased work.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.03D of the Standard Specifications, will be paid for as a part of the extra work.

10-1.13 TEMPORARY PAVEMENT DELINEATION

Temporary pavement delineation shall be furnished, placed, maintained, and removed in conformance with the provisions in Section 12-3.01, "General," of the Standard Specifications and these special provisions. Nothing in these special provisions shall be construed as reducing the minimum standards specified in the Manual of Traffic Controls published by the Department or as relieving the Contractor from his responsibility as provided in Section 7-1.09, "Public Safety," of the Standard Specifications.

GENERAL

Whenever the work causes obliteration of pavement delineation, temporary or permanent pavement delineation shall be in place prior to opening the traveled way to public traffic. Lane line or centerline pavement delineation shall be provided at all times for traveled ways open to public traffic. On multilane roadways (freeways and expressways), edgeline delineation shall be provided at all times for traveled ways open to public traffic.

Work necessary, including required lines or marks, to establish the alignment of temporary pavement delineation shall be performed by the Contractor. Surfaces to receive temporary pavement delineation shall be dry and free of dirt and loose material. Temporary pavement delineation shall not be applied over existing pavement delineation or other temporary pavement delineation. Temporary pavement delineation shall be maintained until superseded or replaced with a new pattern of temporary pavement delineation or permanent pavement delineation.

Temporary pavement markers and removable traffic tape which conflicts with a new traffic pattern or which is applied to the final layer of surfacing or existing pavement to remain in place shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

TEMPORARY LANELINE DELINEATION

Whenever lanelines are obliterated, the minimum laneline delineation to be provided shall be temporary raised pavement markers placed at longitudinal intervals of not more than 7.3 m. The temporary raised pavement markers shall be the same color as the laneline the markers replace. Temporary raised pavement markers shall be, at the option of the Contractor, one of the temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (6 months or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary raised pavement markers shall be placed in conformance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used to place pavement markers in areas where removal of the markers will be required.

Temporary laneline delineation consisting entirely of temporary raised pavement markers placed on longitudinal intervals of not more than 7.3 m shall be used on lanes open to public traffic for a maximum of 14 days. Prior to the end of the 14 days, the permanent pavement delineation shall be placed. If the permanent pavement delineation is not placed within the 14 days, additional temporary pavement delineation shall be provided at the Contractor's expense. The additional temporary pavement delineation to be provided shall be equivalent to the pattern specified for the permanent pavement delineation for the area, as determined by the Engineer.

Full compensation for furnishing, placing, maintaining, and removing the temporary raised pavement markers used for temporary laneline delineation and for providing equivalent patterns of permanent traffic lines for these areas when required shall be considered as included in the contract prices paid for the items of work that obliterated the laneline pavement delineation and no separate payment will be made therefor.

TEMPORARY EDGELINE DELINEATION

Whenever edgelines are obliterated on multilane roadways (freeways and expressways), the edgeline delineation to be provided for that area adjacent to lanes open to public traffic shall consist of, at the option of the Contractor, either solid 100-mm wide traffic stripe of the same color as the stripe the temporary edgeline delineation replaces or shall consist of traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 30 m.

Traffic stripe (100-mm wide) placed for temporary edgeline delineation, which will require removal, shall consist of temporary removable construction grade striping and pavement marking tape listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Temporary removable construction grade striping and pavement marking tape when used shall be applied in conformance with the manufacturer's recommendations. Where removal of the 100-mm wide traffic stripe will not be required, painted traffic stripe used for temporary edgeline delineation shall conform to "Paint Traffic Stripe" of these special provisions, except for payment and the number of coats shall be, at the option of the Contractor, either one or 2 coats. The quantity of painted traffic stripe used for temporary edgeline delineation will not be included in the quantities of paint traffic stripe to be paid for. Paint shall not be used for temporary edgeline delineation on the final layer of surfacing.

The lateral offset for traffic cones, portable delineators or channelizers used for temporary edgeline delineation shall be determined by the Engineer. If traffic cones or portable delineators are used as temporary pavement delineation for edgelines, the Contractor shall provide personnel to remain at the project site to maintain the cones or delineators during hours of the day that the cones or delineators are in use.

Channelizers used for temporary edgeline delineation shall be the surface mounted type and shall be orange in color. Channelizer bases shall be cemented to the pavement in the same manner provided for cementing pavement markers to pavement in "Pavement Markers" of these special provisions, except epoxy adhesive shall not be used to place channelizers on the top layer of pavement. Channelizers shall be, at the Contractor's option, one of the surface mount types (900 mm) listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary edgeline delineation shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

Full compensation for furnishing, placing, maintaining, and removing temporary edgeline delineation shall be considered as included in the contract prices paid for the items of work that obliterated the edgeline pavement delineation and no separate payment will be made therefor.

10-1.14 PORTABLE CHANGEABLE MESSAGE SIGN

Portable changeable message signs shall be furnished, placed, operated, and maintained during each lane closure at those locations approved by the engineer or where designated by the Engineer in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Portable changeable message signs will be paid for on a lump sum basis.

The contract lump sum price paid for portable changeable message sign shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing, placing, operating, maintaining, repairing, replacing, changing messages daily when requested by the Engineer, transporting from location to location, and removing the portable changeable message signs, as specified in the Standard Specification and these special provisions, and as directed by the Engineer.

Attention is directed to "Maintaining Traffic" of these special provisions regarding the use of the portable changeable message signs.

10-1.15 TEMPORARY CRASH CUSHION MODULE

This work shall consist of furnishing, installing, and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the plans, as specified in these special provisions or where designated by the Engineer. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in conformance with the details shown on the plans and these special provisions.

Attention is directed to "Public Safety" of these special provisions.

Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 4.6 m or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no longer required, as determined by the Engineer, sand filled temporary crash cushions shall be removed from the site of the work.

At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either Energite III Inertial Modules, Fitch Inertial Modules or Traffix Sand Barrels manufactured after March 31, 1997, or equal:

- A. Energite III and Fitch Inertial Modules, manufactured by Energy Absorption Systems, Inc., One East Wacker Drive, Chicago, IL 60601-2076. Telephone 1-312-467-6750, FAX 1-800-770-6755
 - 1. Distributor (North): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828. Telephone 1-800-884-8274, FAX 1-916-387-9734
 - 2. Distributor (South): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805. Telephone 1-800-222-8274, FAX 1-714-937-1070
- B. Traffix Sand Barrels, manufactured by Traffix Devices, Inc., 220 Calle Pintesco, San Clemente, CA 92672. Telephone 1-949 361-5663, FAX 1-949 361-9205
 - 1. Distributor (North): United Rentals, Inc., 1533 Berger Drive, San Jose, CA 95112. Telephone 1-408 287-4303, FAX 1-408 287-1929
 - 2. Distributor (South): Statewide Safety & Sign, Inc., P.O. Box 1440, Pismo Beach, CA 93448. Telephone 1-800-559-7080, FAX 1-805 929-5786

Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color, as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified herein may be utilized. If used Fitch modules requiring a seal are furnished, the top edge of the seal shall be securely fastened to the wall of the module by a continuous strip of heavy duty tape.

Modules shall be filled with sand in conformance with the manufacturer's directions, and to the sand capacity in kilograms for each module shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain not more than 7 percent water as determined by California Test 226.

Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

Temporary crash cushion modules shall be placed on movable pallets or frames conforming to the dimensions shown on the plans. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement or bridge deck.

A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the plans, when the closest point of the crash cushion array is within 3.6 m of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods determined by the Engineer.

At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in the permanent work.

Temporary crash cushion modules placed in conformance with the provisions in "Public Safety" of these special provisions will not be measured nor paid for.

10-1.16 EARTHWORK

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Surplus excavated material shall become the property of the Contractor and shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

10-1.17 AGGREGATE BASE

Aggregate base shall be Class 2 and shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications and these special provisions.

The restriction that the amount of reclaimed material included in Class 2 aggregate base not exceed 50 percent of the total volume of the aggregate used shall not apply. Aggregate for Class 2 aggregate base may include reclaimed glass. Aggregate base incorporating reclaimed glass shall not be placed at locations where surfacing will not be placed over the aggregate base.

10-1.18 ASPHALT CONCRETE

Asphalt concrete shall be Type A and shall conform to the provisions in Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions.

10-1.19 CONCRETE PAVEMENT AND PAVEMENT PREPARATION (WEIGH-IN-MOTION)

Existing pavement and underlying base material shall be removed and replaced with concrete pavement, which shall be cured for at least 4 hours prior to the time the lane is to be opened to public traffic. The exact limits of existing pavement removal and depth of existing base removal will be determined by the Engineer.

The Contractor shall remove and replace pavement one lane width at a time for each direction of travel.

The outlines of excavations in the pavement shall be cut on a neat line with a power-driven concrete saw before any material is removed. The depth of such cuts shall be no less than the total thickness of the pavement section or sections to be removed. Residue resulting from cutting operations shall not be permitted to flow across shoulders or lanes occupied by public traffic. Residue shall be removed from the pavement surface before any such material flows off said surface.

Residue and removed materials shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The material remaining in place, after removing pavement and base to the required depth, shall be graded to a plane, watered, and compacted. The finished surface of the remaining material shall not extend above the grade established by the Engineer.

Areas of the base material which are low as a result of over excavation shall be filled, at the Contractor's expense, with pavement concrete at the time and in the same operation that the concrete is placed.

Portland cement concrete pavement for the weigh-in-motion (WIM) system shall conform to the provisions for concrete pavement in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications and these special provisions.

The provisions in Section 40-1.015, "Cement Content," of the Standard Specifications shall not apply.

The concrete for replacement pavement for the WIM system shall contain not less than 400 kg of Portland cement per cubic meter. Portland cement shall be Type II Modified, Type II Pre stress, or Type III. Type II Modified and Type III cement shall conform to the provisions in Section 90-2.01, "Portland Cement," of the Standard Specifications. Type II Pre stress cement shall conform to the requirements for Type II Modified cement, except the mortar, containing the Portland cement to be used and Ottawa sand, when tested in accordance with California Test 527, shall not contract in air more than 0.053 percent.

Calcium chloride conforming to the requirements in Section 90-4, "Admixtures," of the Standard Specifications shall be added to the concrete mix at a rate not to exceed two percent of the dry weight of the cement. The rate shall be as recommended by the concrete supplier subject to the Engineer's approval.

Chemical admixtures and mineral admixtures shall not be used to replace Portland cement.

Prior to placing concrete, a 6.35 mm thick commercial quality polyethylene flexible foam expansion joint filler shall be placed across the original transverse joint faces and extend the full depth of the excavation with the top of the joint filler flush with the top of pavement. The joint filler shall be secured to the existing pavement joint by any method that will hold the joint filler in place during placement of concrete.

The penetration of concrete mixes shall conform to the requirements in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications, except that the nominal penetration shall not exceed 35 mm and the maximum penetration shall not exceed 65 mm.

Concrete shall not be placed when the atmospheric temperature is 4°C or lower. Concrete shall not be placed when the atmospheric temperature is between 4°C and 10°C unless a written outline of proposed methods for protecting the concrete from rapid cooling has been submitted by the Contractor and approved by the Engineer. Concrete placed when the atmospheric temperature is between 4°C and 15°C shall contain Type II Pre stress or Type III Portland cement. Concrete placed when the atmospheric temperature is 15°C or higher shall contain Type II Modified, Type II Pre stress, or Type III Portland cement.

Concrete shall be spread, compacted, and shaped using stationary side forms in accordance with the requirements in Sections 40-1.07, "Spreading, Compacting and Shaping," and 40-1.07A, "Stationary Side Form Construction," of the Standard Specifications, except as follows:

The third paragraph in Section 40-1.07, "Spreading, Compacting and Shaping," shall not apply.

Wood side forms not less than 40-mm nominal thickness may be used. Wood side forms shall conform to the provisions in Section 51-1.05, "Forms," of the Standard Specifications.

The concrete may be spread, shaped and compacted in accordance with the last paragraph of Section 40-1.07A.

Upon written request by the Contractor, the Engineer may allow use of shoulders in lieu of stationary side forms if such shoulders are suitable. Such approval by the Engineer shall in no way relieve the Contractor of meeting all other requirements.

Transverse weakened plane joints shall be constructed using the sawing method where directed by the Engineer. The exact time of sawing shall be the Contractor's responsibility, but in any event, the joints shall be sawed prior to opening the pavement to traffic. The minimum depth of cuts for the sawed weakened plane joints on either side of each WIM scale frame location shall be one half the pavement thickness.

The requirements in Section 40-1.08B(3), "Repair of Spalls, Ravelling and Tearing," of the Standard Specifications shall not apply.

Tests to determine the coefficient of friction of the final textured surface will be made only if the Engineer determines by visual inspection that the final texturing may not have produced a surface having the specified coefficient of friction. Any tests to determine the coefficient of friction will be made after the pavement is opened to public traffic, but not later than 5 days after concrete placement.

Concrete pavement shall be cured by the curing compound method as set forth in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. The curing compound shall be Pigmented Curing Compound conforming to the requirements of ASTM Designation: C309, Type 2, Class B. The curing compound shall be applied at the nominal rate of 3.7 m²/L. The minimum curing period as specified elsewhere in this section "Concrete Pavement and Pavement Preparation (weigh-in-motion)" shall be considered as starting when the curing compound has been applied to the entire slab or slabs of pavement being replaced. Fogging of the pavement surface with water after the curing compound has been applied will not be required. Any damage to the curing compound after the pavement is opened to public traffic shall not be repaired. Should the film of curing compound be damaged from any cause before the pavement is opened to public traffic, the damaged portion shall be repaired immediately with additional compound, at the Contractor's expense.

The Portland cement concrete pavement for the WIM system shall be ground.

All grinding shall be in conformance with the provisions in Section 42-2, "Grinding," of the Standard Specifications and these special provisions.

A "Materials Information" handout for disposal of residue from grinding Portland cement concrete pavement is not available to the Contractor for this contract. The residue from grinding Portland cement concrete pavement shall be disposed of at a site outside of the highway right of way in accordance with Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way," of the Standard Specifications. The disposal site selected by the Contractor shall be one approved by the California Regional Water Quality Control Board having jurisdiction over the site. A copy of such approval shall be delivered to the Engineer prior to disposal of residue to the site.

The ground surface will be straightgedged at locations to be determined by the Engineer with a straightedge 3.66 m long. When the straightedge is laid on finished pavement in a direction parallel with centerline, or normal to centerline, the surface shall not vary more than 3 mm from the lower edge. Additional grinding shall be performed, if necessary, to meet this requirement. The surface of the concrete pavement will not be profiled and the Profile Index requirements shall not apply.

The contract price paid per cubic meter for concrete pavement (weigh-in-motion) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing concrete pavement, complete in place, including sawing, grinding new weigh-in-motion pavement, removing and disposing of existing pavement and base material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.20 GRIND EXISTING ASPHALT CONCRETE PAVEMENT

Grinding existing asphalt concrete pavement shall conform to the provisions in Section 42-2, "Grinding," of the Standard Specifications and these special provisions.

Grinding shall be performed as shown on the plans.

The ground surface will be straightedged at locations to be determined by the Engineer with a straightedge 3.66 m long. When the straightedge is laid on finished pavement in a direction parallel with centerline, or normal to centerline, the surface shall not vary more than 3 mm from the lower edge. Additional grinding shall be performed, if necessary, to meet this requirement. The surface of the concrete pavement will not be profiled and the Profile Index requirements shall not apply.

Fog seal coat shall be applied to all ground asphalt concrete pavement in conformance with the provisions in Section 37-1, "Seal Coat" of the Standard Specifications.

The contract price paid per square meter for grind existing asphalt concrete pavement shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in grinding existing asphalt concrete pavement, complete in place, including applying fog seal coat as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.21 EDGE DRAIN

Edge drains shall conform to the details shown on the plans and the provisions in Section 68-3, "Edge Drains," of the Standard Specifications and these special provisions.

A marker shall be placed at each edge drain outlet as directed by the Engineer. Markers shall comply with Class 1, Flexible Post Delineators as shown on Revised Standard Plan Sheet RSP A73C. In the reflectorized portion there shall be placed the letters "CO".

Full compensation for furnishing and installing markers and applying "CO" markings shall be considered as included in the contract price paid per meter for 50 mm Plastic Pipe (Edge Drain Outlet) and no separate payment will be made therefor.

10-1.22 PAINT TRAFFIC STRIPE

Painted traffic stripes (traffic lines) shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

At the option of the Contractor, permanent traffic striping and pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the painted traffic stripes and pavement markings specified herein. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications. If permanent tape is placed instead of painted traffic stripes and pavement markings, the tape will be measured and paid for by the meter as paint traffic stripe and by the square meter as paint pavement marking of the number of coats designated in the Engineer's Estimate.

10-1.23 PAVEMENT MARKERS

Pavement markers shall be placed in conformance with the provisions in Section 85, "Pavement Markers," of the Standard Specifications.

SECTION 10-2. (BLANK)

SECTION 10-3. HIGH SPEED WEIGH-IN-MOTION SYSTEM

10-3.01 DESCRIPTION

High Speed Weigh-In-Motion System shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

The High Speed Weigh-In-Motion System (hereafter "WIM System") shall include equipment and software for collecting, processing, storing, transmitting (to a host computer) and manipulating information related to the counting, classifying and speed monitoring of all vehicles and the weighing of trucks and buses.

10-3.02 CERTIFICATES OF COMPLIANCE

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturers in accordance with the provisions of Section 6-1.07, "Certificates of Compliance", of the Standard Specifications for the following items used:

- Conduits
- Pull boxes
- Controller cabinets
- Telephone demarcation cabinets
- Power distribution cabinets

10-3.03 COST BREAK-DOWN

Cost break-downs shall conform to the provisions in Section 86-1.03, "Cost Break-Down," of the Standard Specifications and these special provisions.

The Engineer shall be furnished a cost break-down for each contract lump sum item of work described in this Section 10-3.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and values shall be included in the cost break-down submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-down submitted for approval.

At the Engineer's discretion the approved cost break-down may be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

No adjustment in compensation will be made in the contract lump sum prices paid for the various electrical work items due to any differences between the quantities shown in the cost break-down furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions. Full compensation for the costs of preparing the cost break-down for each of the lump sum electrical items shall be considered as included in the lump sum price for the High Speed Weigh-In-Motion System and no separate payment will be paid therefor.

The sum of the amounts for the units of work listed in the cost break-down for electrical work shall be equal to the contract lump sum price bid for the work. Overhead, profit, bond premium, temporary construction facilities, plant and other items shall be included in each individual unit listed in the cost break-down; however, costs for traffic control system shall not be included.

The cost breakdown shall, as a minimum, include the following items in addition to those listed in the Standard Specifications:

- Foundations - each type including service and controller foundations
- Conduit - list by each size, type and installation method
- Pull boxes - each type
- Conductors - each size and type
- Loop detectors - each type and size
- Controller cabinets - each type
- Weigh-in-motion equipment
- Telephone demarcation cabinets
- Power distribution cabinets

10-3.04 HIGH SPEED WEIGH-IN-MOTION SYSTEM CONTROLLER CABINET

The controller cabinet for the high speed weigh-in-motion system shall conform to the requirements in "Traffic Signal Control Equipment Specifications," (TSCES) and addenda thereto issued by the State of California, Department of Transportation.

The cabinet shall consist of a housing 1A or B, with mounting cage 1, and equipment as shown on the plans in accordance with Chapter 6, "Specifications for Cabinet Models 332, 334 and 336," of the TSCES.

The first sentence of Chapter 6, Section 3, Paragraph 6.3.4 of the TSCES is amended to read:

Two steel supporting angles extending from the front to the back rails shall be supplied to support each shelf. The shelves shall be the width of the mounting cage and 457 mm deep. Each shelf shall be attached to the top of two supporting angles with four screws. The front of the shelf shall abut against the front member of the mounting cage.

The police panel specified in Chapter 6, Section 2, Subsection 6.2.6, "Police Panel," of the TSCES may be omitted.

The Contractor shall construct controller cabinet foundation as shown on Standard Plan ES-4B for Model 334 cabinet (including furnishing and installing anchor bolts), shall install the controller cabinet on the foundation, and shall make all field wiring connections to the terminal blocks in the controller cabinet. The equipment to foundation seam shall be effectively sealed to prevent insect entry.

10-3.05 POWER DISTRIBUTION CABINET

Power distribution cabinet shall be single exterior hinged door, dust tight NEMA Type 3R enclosure containing the electrical mounting panel. The enclosure shall be made of 14-gauge steel minimum with all seams continuously welded. A rolled lip shall be provided around three sides of the hinged door and around all sides of the opening. The door shall be provided with a neoprene gasket that is attached with an oil resistant adhesive. The door shall be maintained closed with door clamps. Security shall be provided by a hasp and staple for padlocking. The following equipment shall be provided at the interior mounting panel of the enclosure as shown on the plans.

Transformer shall be double-wound, 2-KVA, 60-HZ, surface-mounted, single phase dry type transformer with 240/480-volt primary, and 120/240-volt secondary, with 2-2.5 percent taps on the primary side of the transformer.

Transformer primary disconnect shall be 15-A, 2-pole molded case unit circuit breaker, 15-A, 2-pole molded case unit circuit breaker on the secondary side of transformer, and two 20-A, single pole unit circuit breakers as shown on the plans.

10-3.06 CONDUIT

Conduit to be installed underground and in a foundation shall be Type 1 or Type 3 unless otherwise specified.

Conduit sizes shown on the plans and specified in the Standard Specifications and these special provisions are referenced to metallic type conduit. When rigid non-metallic conduit is required or allowed, the nominal equivalent industry size shall be used as shown in the following table:

| Size Designation for Metallic Type Conduit | Equivalent Size for Rigid Non-metallic Conduit |
|--|--|
| 21 | 20 |
| 27 | 25 |
| 41 | 40 |
| 53 | 50 |
| 63 | 65 |
| 78 | 75 |
| 103 | 100 |

When a standard coupling cannot be used for joining Type 1 conduit, a UL listed threaded union coupling conforming to the provisions in Section 86-2.05C, "Installation," of the Standard Specifications, or a concrete-tight split coupling, or concrete-tight set screw coupling shall be used.

After conductors have been installed, the ends of conduits terminating in pull boxes, service equipment enclosures, and controller cabinets shall be sealed with an approved type of sealing compound.

TRENCHING INSTALLATION OF CONDUIT.--Installation of size 78 conduit and 50mm Plastic Pipe (Edge Drain Outlet) from the weigh-in-motion scales, between the edge of traveled way and the edge of shoulder, shall be installed by the "Trenching in Pavement Method," described in Section 86-2.05C of the Standard Specifications and these special provisions.

The trench shall not exceed 203mm in width.

Size 78 conduit shall be Type 1.

10-3.07 PULL BOXES

Grout shall be placed in the bottom of pull boxes.

A pull box marker shall be placed at each pull box not in a concrete surface, Asphalt Concrete surface, or where the pull box is not adjacent to a cabinet. Markers shall comply with Class 1, Flexible Post Delineators as shown on Standard Plan Sheet A73C. In the reflectorized portion there shall be placed the letters "PB".

Full compensation for furnishing and installing pull box markers and applying "PB" shall be considered as included in the contract lump sum price paid for the High Speed Weigh-In-Motion System and no separate payment will be made therefor.

10-3.08 TRAFFIC PULL BOXES

Traffic pull boxes and covers shall have a vertical proof-load strength of 111 kN. The 111 kN load shall be distributed through a 229-mm x 229-mm x 51-mm steel plate according to Federal Specification RR-F-621e. This load shall be placed anywhere on the box and cover for a period of one minute without causing any cracks or permanent deformations.

The No. 5(T) pull boxes shall be reinforced with a galvanized Z-bar welded frame and cover similar to that shown on the plans for No. 6(T) pull boxes. Frames shall be anchored to the boxes by means of 6-mm x 57-mm long concrete anchors. Six concrete anchors shall be provided for each No. 5(T) and No. 6(T) pull box, one placed in each corner and one placed near the middle of each of the longer sides.

Hold down screws shall be 9-mm hex flange cap screws of Type 316 stainless steel. The nut shall be zinc plated carbon steel and shall be made vibration resistant with a wedge ramp at the root of the thread. The nut shall be spot welded to the underside of, or fabricated with, the galvanized Z-bar pull box frame.

Steel covers shall be countersunk approximately 6 mm to accommodate the bolt head. The bolt head shall not extend more than 3 mm above the top of the cover when tightened down. A 6-mm tapped hole and brass bonding screw shall be provided.

The opening of traffic pull boxes shall have the following dimensions:

| Pull Box Type | Width (± 25 mm) | Length (± 25 mm) |
|---------------|----------------------|-----------------------|
| No. 5(T) | 330 mm | 600 mm |
| No. 6(T) | 430 mm | 760 mm |

Concrete placed around and under traffic pull boxes as shown on the plans shall contain a minimum of 325 kg of Portland cement per cubic meter.

After the installation of traffic pull boxes, the steel covers shall be installed and kept bolted down during periods when work is not actively in progress at the pull box. When placing the steel cover for the final time, the cover and the Z-bar frame shall be cleaned of all debris and securely tightened down.

10-3.09 CONDUCTORS AND WIRING

Splices shall be insulated by "Method B". Splices shall be "C" shaped compression connectors and soldered. Splices of loop wires to the Detector Lead in Cables (DLC's) shall be as recommended by the WIM vendor.

The minimum insulation thickness, at any point, for Type USE, RHH or RHW wire shall be 1.0 mm for conductor sizes No. 14 to No. 10, inclusive, and 1.3 mm for No. 8 to No. 2, inclusive. The minimum insulation thickness, at any point, for Type THW and TW wires shall be 0.69 mm for conductor sizes No. 14 to No. 10, inclusive, 1.02 mm for No. 8, and 1.37 mm for No. 6 to No. 2, inclusive.

10-3.10 DETECTORS

Loop detector sensor units shall be furnished as part of the "Central Unit".

Loop wire shall be Type 2.

Loop detector lead-in cable shall be Type B.

Slot cutting for inductive detector loops shall not be performed until after the concrete pavement has been ground, straightedged and brought into tolerance as provided in these special provisions.

Slots in Portland cement concrete shall be filled with elastomeric sealant or hot-melt rubberized asphalt sealant, or shall be filled with an epoxy sealant conforming to the provisions in Section 95-2.09, "Epoxy Sealant for Inductive Loops (State Specification 8040-06)," of the Standard Specifications.

10-3.11 CONCRETE REMOVAL (WIM SCALE FRAME)

Neither saw cutting nor the removal of concrete for WIM scale frames shall be performed until after the concrete pavement has been ground, straightedged and brought into tolerance as provided in these special provision.

The outlines of excavations in the pavement for WIM scale frames shall be cut on a neat line to a minimum depth of 50 mm with a power-driven concrete saw before any material is removed. Residue resulting from cutting operations shall not be permitted to flow across shoulders or lanes occupied by public traffic. Residue shall be removed from the pavement surface before any such material flows off the surface, and shall be disposed of in accordance with Section 7-1.13, "Disposal of Materials outside the Highway Right of Way," of the Standard Specifications.

No concrete shall be removed until all saw cutting for other sensors, including loops and loop wires, has been completed for all lanes in the same direction.

If scale frames and weigh pads are not installed by the end of each working day, such excavations shall be backfilled with temporary asphalt concrete to conform to the grade of the adjacent concrete pavement prior to opening lanes to public traffic.

10-3.12 ON-SITE EQUIPMENT

The WIM system shall provide for single threshold weighing, and operate over a speed range of 8 km/h (5 mph) to 161 km/h (100 mph). Single threshold weighing shall consist of a scale or scales in each lane of travel. The weigh sensors shall cover the entire lane width of 3.6 m. The WIM system shall consist of the minimum following components:

1. Wheel scale or scales, scale lead-in-cable as required, frames and mounting hardware for each lane to be instrumented. The scales shall report weigh data for each wheel track (right axle weight and left axle weight). Such wheel data shall be uniform across any section of the scale. Installation of scales shall conform to the details shown on the plans. A representative of the WIM manufacturer shall be on site during the installation of the WIM scale frames and scales.
2. Two inductive loop detectors per lane for measuring speed and vehicle length. Inductive detector loops and lead-in cable are provided for elsewhere in these special provisions.
3. A central unit shall be installed in the controller cabinet. The central unit shall include all the equipment and software necessary to calculate, store and transmit to a host computer all data specified in these special provisions. The modem to be installed in the controller cabinet shall be compatible with the host computer modems described under "High Speed WIM System Application Software" elsewhere in these special provisions. The user shall have the capability to enter a site designation code up to three characters.
4. A battery powered portable personal computer (PC) adequate to connect to the central unit for system testing, adjustments, programming, on-site direct data downloading, and off-site downloading and testing of the Weigh-In-Motion system with software and cables to facilitate these functions. The portable PC shall have, as a minimum, a 200 MHz processor, active matrix color display, 64 megabytes of RAM, one built-in 3.5-inch floppy disk drive with a minimum capacity of 1.44 megabytes, one 2 GB or larger internal hard disk drive, and an internal 56 kbps or faster modem with MNP 5.
5. All necessary interconnecting cables and miscellaneous materials required making the system operational.

Any proposed deviations in the equipment specified herein or proposed deviations in the configurations of wheel scales, axle sensors, or inductive detector loops shown on the plans shall be submitted to the Engineer. Permission by the Engineer to use alternative equipment and/or configurations shall not relieve the Contractor from meeting the WIM system functional requirements set forth in these special provisions.

Full compensation for any additional costs resulting from deviations or substitutions of equipment shall be considered as included in the contract price paid for the item of work involved and no additional compensation will be allowed therefor.

10-3.13 FUNCTIONAL REQUIREMENTS

1. The WIM System shall be able to accommodate vehicles and vehicle combinations with up to nine axles and shall automatically determine for each vehicle, by lane of travel:

A. Weight of each axle:

| Accuracy: | MEAN | STD. DEV. |
|--------------|------|-----------|
| Single axle | ±5% | 8% |
| Tandem axle | ±5% | 6% |
| Gross weight | ±5% | 5% |

B. Axle Spacing, Vehicle Length, and Speed:

| Accuracy: | MEAN | STD. DEV. |
|----------------|------------------------|----------------------|
| Axle Spacing | ±6" (±0.152 m) | 12" (0.305 m) |
| Vehicle Length | ±12" (±0.305 m) | 18" (0.457 m) |
| Speed | ±1 mph (±1.61 Km/h) | 2 mph (3.22 Km/h) |

The WIM system shall provide for calibration features such that the required accuracies can be met at all speeds within the operating speed range set forth under "On Site Equipment" elsewhere in these Special Provisions.

Accuracy requirement testing shall be performed using one or more test trucks deemed by the Engineer to be representative of the truck traffic through the WIM system site. Each test truck shall be loaded at a minimum of 90 percent of the truck's legal operating weight.

Conformance to accuracy requirements will be based upon a minimum of two test truck measurements at each 8km/h (5 mph) increment between the typical minimum and maximum operating speeds of the truck traffic through the WIM system site.

C. Vehicle classification:

The WIM system shall provide for a minimum of 15 vehicle classifications. Class 1 through Class 13 shall be used according to Federal Highway Administration's (FHWA) Scheme "F" (as shown in Section 4, Chapter 3 of the FHWA Traffic Monitoring Guide). Class 14 will identify special vehicles as determined by the user. Class 15 will identify any vehicle, which does not conform to the classification criteria for Classes 1 through 14. Classification criteria for Classes 1 through 14 shall be programmable by the user.

The WIM system shall provide sufficient flexibility in programming parameters including number of axles, axle spacing, and weights (gross, or axle and gross) for each of these classes so that accurate classifying is achievable.

D. Invalid measurements:

An "invalid measurement" code shall be assigned to any vehicle meeting the front axle weight threshold (discussed below) when (1) the left and right wheel weights of any axle have a difference of 40 percent or more; and (2) either of the wheel weights of such axle exceeds 2.0 kip (907 kg). Both the 40 percent and 2.0 kip (907 kg) values shall be programmable by the operator. Any vehicle assigned an "invalid measurement" code shall not be considered a "Weighed Vehicle" but shall be classified and counted and all vehicle data shall be stored in the vehicle record.

E. Determination of weight violations:

For any vehicle meeting the front axle weight threshold (discussed below), the WIM system shall determine which, if any, axle(s) or axle grouping(s) exceed the weight limits set forth in the "Weight Violation Table" contained in these special provisions. Any vehicle with one or more weight violations will be coded as to such a violation or combination of violations. The weight limitations set forth in the "Weight Violation Table" shall be the default settings. Such weights shall be programmable by the user.

2. The central unit of the WIM system shall calculate and temporarily store all specified data on a storage medium. The on-site data storage device shall have the capacity to store a minimum of seven days of vehicle count data and individual vehicle records. The storage device shall be completely solid state with no mechanical components and shall be a type that is not susceptible to loss of accumulated data should electrical power be interrupted. The central unit shall continue to calculate and store data for all vehicles passing through the system during periods of access, both on-site by portable PC and remotely by the host computer for purposes of programming, real-time view, and downloading of data.

The central unit shall store the following data:

- A. Hourly vehicle counts by class and by speed range for each 24 hour period (Class/Count summary).
- B. Individual vehicle records for all vehicles with a front axle weight greater than 3.5 kip (1590 kg) (hereafter referred to as "truck records"). The front axle weight threshold for truck records shall be programmable by the operator with 3.5 kip (1590 kg) as a default setting. Each truck record shall include, as a minimum, the following data:
 - i. Time and Date.
 - ii. Lane Number.
 - iii. Vehicle Number.
 - iv. Speed.
 - v. Vehicle Classification.
 - vi. Weight in kips of each wheel or dual set of wheels by left and right side and by axle number.
 - vii. Spacing in feet between each sequentially numbered axle.
 - viii. Overall length of each vehicle or combination of vehicles in feet.
 - ix. Code for weight violation(s).
 - x. Code for invalid measurement(s).

3. Data shall be calculated and formatted such that all data can be accessed and all required reports can be generated by use of the high speed WIM system application software.
4. All equipment, with exception of the central unit's modem, shall operate properly within an atmospheric temperature range of -29°C and 50°C.
5. The central unit's modem shall be fully compatible with the host computer modem and shall conform to the following:
 - A. The modem shall operate properly within a temperature range of 0°C and 50°C and shall not be subject to damage by temperatures within a range of -40°C and 70°C.
 - B. The modem shall include the following features:
 1. Compatibility with CCITT and Bell modulation standards from 300 bps to 14,400bps.
 2. Data compression through CCITT V.42bis and MNP 5.
 3. Error control through CCITT V.42 (including MNP 2-4).
 4. Capability of processing 14,400, 9600, 4800, 2400, or 1200 bps of serial asynchronous digital data for transmission over the 2 - wire public switched telephone network (PSTN).

10-3.14 HIGH SPEED WIM SYSTEM APPLICATION SOFTWARE

An application program, hereafter referred to as the "system program", which can be run on the host computer shall be furnished as part of the high speed WIM system. The host computer will be furnished by others and will consist of:

1. Hewlett Packard Model HP Vectra VL5 personal computer using Windows 95.
2. Dot matrix printer (parallel).
3. Universal Data Systems V.3229, or compatible, modem.

The system program shall provide communications between the host computer and the on-site central unit and shall process downloaded data to generate the specified reports and the specified ASCII files. Although referred to herein as a single software program, communications functions and data processing functions may be provided as two separate programs as long as all functional requirements are met. The system program shall be "user friendly", hierarchical menu driven and shall perform the following applications:

1. Communications:

The communications portion of the system program shall include the following applications:

A. Real time view:

The real time view application shall provide for on-line monitoring of traffic. The display on the host computer shall depict the axle configuration of each vehicle passing through the site. The contents and format for the real time display shall be similar to the sample display contained in these special provisions. The user shall have the option of displaying either all traffic or only vehicle classifications 4 through 15 as well as the option of displaying a selected individual lane or all lanes.

Printing of the real time data on the host computer printer shall be facilitated by means of an on/off toggle key from the keyboard.

B. System data programming:

The system data programming application shall provide for on-line modification to the central unit's software parameters, such as speed and weight calibration factors, vehicle classification parameters, weight violation table parameters, and front axle weight threshold.

C. Manual downloading:

The manual downloading application shall provide for the downloading of selected daily data files from the storage medium of the central unit to the storage medium of the host computer. The program shall provide for a listing of the daily

data files stored in the central unit and shall provide for user selection of the file or files to be downloaded from such a listing. The program shall provide for the downloading of the current day's data stored as of the time of downloading.

D. Automatic downloading:

The automatic downloading application shall provide for unattended downloading of daily data files stored in the central unit's storage medium to the storage medium of the host computer. The program shall provide the following:

- i. User's input for the date and time that unattended downloading is to begin.
- ii. Downloading of all daily files not previously downloaded by the automatic downloading application.
- iii. At least three attempts to make telephone connection with the central unit.
- iv. At least three attempts to download files from the central unit before aborting download.
- v. Discontinuation of telephone connection after downloading of files from the central unit (or after an abort) and returning the host computer to a standby mode.

E. History file:

The history file application shall create a daily file which chronologically records events occurring during manual and automatic downloading sessions. Such events shall include, but not be limited to, modem result messages, start and end time of each file download and any pertinent messages generated by the program. The program shall provide for either:

- i. The history file shall be in the form of an ASCII text file which can be viewed or sent to the printer or,
- ii. A menu selection which shall provide for a listing of available history files and user selection of a file to be sent to the printer in the form of a report.

The communications portion of the system program shall meet the following functional requirements:

A. Host computer's modem configuration:

The program shall initialize the host computer's modem so that all necessary operating characteristics are set.

B. Baud rate:

The program will provide for operation at a minimum rate of 9600 baud.

C. Error control:

The program shall not in any way disable the modems' error-checking features which prevent phone-line noise from corrupting data during file downloading.

D. File downloading monitoring:

The program shall display a window that allows the user to monitor the progress of file downloading. The program shall also provide for the abort of a file download.

2. Report Preparation:

The report preparation application shall generate specified reports using the downloaded data. Such reports shall be sent to the host computer printer. The program shall prepare the following reports:

A. From vehicle class/count summary file:

- i. Distribution of class and speed counts by lane.
- ii. Distribution of vehicle counts by hour of day by lane.
- iii. Distribution of vehicle classifications by hour of day.
- iv. Distribution of vehicle classifications by day of month.
- v. Distribution of vehicles by speed by hour of day.

B. From individual truck records file:

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- i. Distribution of truck record data by lane.
- ii. Distribution of weight violations and invalid measurements for vehicle classification 4 through 15.
- iii. Distribution of weight violations by hour of day for vehicle classifications 4 through 14.
- iv. Distribution of overweight vehicles by hour of day for vehicle classifications 4 through 14.
- v. Distribution of gross weights for vehicle classifications 4 through 14.
- vi. Distribution of 18 kip (80kN) equivalent single axle loading (ESALS) by hour of day for vehicle classifications 4 through 14. Program provides for user input of:
 - a. Pavement type:
 - (1) flexible pavement and structural number; or,
 - (2) rigid pavement and slab thickness.
 - b. Vehicle status:
 - (1) "all" weighed vehicles (default); or,
 - (2) "legal only" weighed vehicles; or,
 - (3) "overweight only" weighed vehicles.
- vii. Distribution of trucks by day of month for classifications 4 through 15.

The reports shall include all information contained in and formatted similar to the sample reports contained in these special provisions. The reports shall be printed in condensed print when necessary to fit on 215 mm x 279 mm (8 1/2" x 11") sheets.

Determination of 18 kip (80kN) equivalent single axle loads shall be in accordance with the "Axle Load Equivalency Factor" tables contained in these special provisions.

The program shall provide for the generation of reports in the following two modes:

A. Manual mode:

For daily reports the program shall provide for user selection of the date and the specific report. For monthly reports, the program shall provide for user selection of the month/year and the specific report. The selected monthly report shall include the data from all downloaded daily data files resident with the system program on a directory or subdirectory of the host computer's storage medium. The program shall also provide for user selection of the lane or lanes to be covered by the specific report (not applicable to the "Distribution of Class and Speed Counts by Lane", the "Distribution of Vehicle Counts by Hour of Day by Lane" and the "Distribution of Truck Record Data by Lane" reports).

The default shall be "all lanes." The printed report shall note which lanes are represented.

B. Automatic mode:

The program shall provide for user designation of one or a combination of the specific daily reports for automatic processing. User selection of lane or lanes is not required (the "all lanes" default may be used). User selection of vehicle status for the 18 kip (80kN) ESAL report is not required (the "all" weighed vehicles default may be used). Such designations shall be effected by means of either:

- i. An ASCII text file, which can be revised with text editor or word processor, supplied with a "Sample" designation; or,
- ii. A menu selection which shall provide for user input of designation.

Upon selection of automatic mode of report preparation by the user, the program shall send to the printer all pre-designated reports for all downloaded daily data files resident with the system program on a directory or subdirectory of the host computer's storage medium.

The designated reports shall remain in effect for subsequent automatic mode sessions unless report designation is revised by the user.

3. Truck Record Batch Print:

The truck record batch print application shall provide for the display of, and on/off printer toggle of, individual truck records. The program shall provide for a listing of the daily truck record files available on the storage medium of the host computer and the user's selection of one of those files. The program shall also provide for the user's selection of the vehicle class or classes for which individual truck records will be displayed or printed as well as the starting hour of day.

The user shall have the following options in viewing and printing the individual truck records:

- A. Scroll and print continuously all records for the selected class(es); user has capability to stop/resume scrolling or terminate program.
- B. Scroll each record one at a time; user has capability to:
 - i. Print displayed record and display next record.
 - ii. Display next record.
 - iii. Terminate program.

Example of the truck record batch print is included in these special provisions.

4. ASCII Export Utility:

The ASCII export utility application shall allow the user to generate specified ASCII files using downloaded files. The user will have the choice of:

- A. From vehicle class/count summary file:
 - i. ASCII classification file.
 - ii. ASCII speed file.
- B. From individual truck record file:
 - i. ASCII truck record file.

The file formats for these files are contained in these special provisions.

5. TMG Files Utility:

The TMG files utility shall allow the user to generate ASCII files conforming to the instructions contained in Section 6 of the FHWA Traffic Monitoring Guide using downloaded files.

10-3.15 DATA FILES

Notwithstanding the method of data manipulation and formatting used by the central unit, data files shall conform to the following:

1. Individual daily data files shall be created and stored in the storage medium of the central unit. Each daily data file shall include data for each 00:00 hour through a 24:00 hour period and shall have a file name which uniquely identifies the file as to site designation, date, and file contents (i.e. class/count summary data, individual truck record data, or both).
2. The daily data files shall be created at the start of each day, data for each vehicle shall be filed within one hour of the vehicle's passing through the site, and the current day's files shall be accommodative to downloading at any time during the day. Data file structure shall be accommodative to efficient use of storage medium space and rapid downloading via modem to the host computers.
3. Daily files containing class/count summary data and individual truck records data may be created in the storage medium of the central unit as two separate daily files or as one daily file. However, if one daily file is created and downloaded as such, the system program shall create two separate daily files, each with a file name which uniquely identifies it as to site, date, and whether it is a vehicle class/count summary file or an individual truck records file.

10-3.16 ACCEPTANCE TEST

The Contractor shall demonstrate that the high speed WIM system is available for use by the Department of Transportation by successfully completing the acceptance test for each lane of data collection.

The acceptance test shall consist of the following:

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1. Continuous operation of the high speed WIM system on-site equipment for 72 consecutive hours. Failure of the system to record and store data meeting the requirements set forth in these special provisions for an accumulated time exceeding 3 hours during the 72 hour period shall be cause for the acceptance test to be repeated.
2. Testing of the high speed WIM system application software during the above noted 72 hours period and the full working day following the 72 hour period. Failure of the software to perform any application meeting the requirements set forth in these special provisions shall be cause for the acceptance test to be repeated.

Unavailability shall be the failure of the system to pass the acceptance test. Failure of the host computer or its peripheral equipment or of a communication line not furnished by the Contractor to transmit data may be considered not to render the system unavailable, provided that the Contractor demonstrates to the satisfaction of the Engineer that the failure is not caused by any of the Contractor furnished equipment.

10-3.17 MAINTENANCE AND OPERATIONS MANUALS

The Contractor shall furnish a maintenance manual for the central unit, including vehicle detector sensor units, and an operation manual for the system. The maintenance manual and operation manual may be combined into one manual. The manual(s) shall include, but need not be limited to, the following items:

1. Specifications.
2. Design characteristics.
3. General operation theory.
4. Function of all controls.
5. Trouble shooting procedure (diagnostic routine).
6. Block circuit diagram.
7. Geographical layout of components.
8. Schematic diagrams.
9. List of component parts with stock numbers.
10. Documentation for application software.

10-3.18 WARRANTY

The wheel scales, lead-in cables, frames and mounting hardware provided shall include the manufacturer's or supplier's 5 year warranty. All other equipment specified under on-site equipment of these special provisions shall include the manufacturers or suppliers two year warranty.

The warranty shall include all parts and all installation costs necessary, to make the repairs.

Such warranty periods shall begin upon satisfactory completion of the acceptance test of the weigh-in-motion system.

10-3.19 PAYMENT

The contract lump sum price paid for high speed weigh-in-motion system shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals, and for doing all the work involved in installing the High Speed Weigh-In-Motion System, complete in place, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

ASCII SPEED FILE FORMAT

| FIELD | LENGTH | STARTS IN COLUMN |
|------------------|--------|------------------|
| Lane | 2 | 1 |
| Hour | 2 | 4 |
| Count, 0-35 MPH | 4 | 7 |
| Count, 36-40 MPH | 4 | 12 |
| Count, 41-45 MPH | 4 | 17 |
| Count, 46-50 MPH | 4 | 22 |
| Count, 51-55 MPH | 4 | 27 |
| Count, 56-60 MPH | 4 | 32 |
| Count, 61-65 MPH | 4 | 37 |
| Count, 66-70 MPH | 4 | 42 |
| Count, 71-75 MPH | 4 | 47 |
| Count, 76-80 MPH | 4 | 52 |
| Count, 81-85 MPH | 4 | 57 |
| Count, > 86 MPH | 4 | 62 |

ASCII CLASSIFICATION FILE FORMAT

| FIELD | LENGTH | STARTS IN COLUMN |
|-----------------|--------|------------------|
| Lane | 2 | 1 |
| Hour | 2 | 4 |
| Count, Class 1 | 4 | 7 |
| Count, Class 2 | 4 | 12 |
| Count, Class 3 | 4 | 17 |
| Count, Class 4 | 4 | 22 |
| Count, Class 5 | 4 | 27 |
| Count, Class 6 | 4 | 32 |
| Count, Class 7 | 4 | 37 |
| Count, Class 8 | 4 | 42 |
| Count, Class 9 | 4 | 47 |
| Count, Class 10 | 4 | 52 |
| Count, Class 11 | 4 | 57 |
| Count, Class 12 | 4 | 62 |
| Count, Class 13 | 4 | 67 |
| Count, Class 14 | 4 | 72 |
| Count, Class 15 | 4 | 77 |

For the above two files:

Each field shall be comma delimited.

For each day's file there is one record for each lane for each hourly period.

ASCII TRUCK RECORD FILE FORMAT

| <u>FIELD</u> | <u>LENGTH</u> | <u>DECIMAL PLACES</u> | <u>STARTS IN COLUMN</u> |
|---------------------------------|---------------|---------------------------|-----------------------------|
| LANE | 1 | | 1 |
| MONTH | 2 | | 3 |
| DAY | 2 | | 6 |
| YEAR | 2 | | 9 |
| HOUR | 2 | | 12 |
| MINUTE | 2 | | 15 |
| SECOND | 2 | | 18 |
| VEHICLE NO. | 5 | | 21 |
| CLASS | 2 | | 27 |
| GROSS WEIGHT | 6 | 1 | 30 |
| LENGTH | 6 | 1 | 37 |
| SPEED | 5 | 1 | 44 |
| VIOLATION CODE | 3 | | 50 |
| AXLE 1 RT. WEIGHT | 4 | 1 | 54 |
| AXLE 1 LT. WEIGHT | 4 | 1 | 59 |
| AXLE 2 RT. WEIGHT | 4 | 1 | 64 |
| AXLE 2 LT. WEIGHT | 4 | 1 | 69 |
| AXLE 1-2 SPACING | 4 | 1 | 74 |
| AXLE 3 RT. WEIGHT | 4 | 1 | 79 |
| AXLE 3 LT. WEIGHT | 4 | 1 | 84 |
| AXLE 2-3 SPACING | 4 | 1 | 89 |
| AXLE 4 RT. WEIGHT | 4 | 1 | 94 |
| AXLE 4 LT. WEIGHT | 4 | 1 | 99 |
| AXLE 3-4 SPACING | 4 | 1 | 104 |
| AXLE 5 RT. WEIGHT | 4 | 1 | 109 |
| AXLE 5 LT. WEIGHT | 4 | 1 | 114 |
| AXLE 4-5 SPACING | 4 | 1 | 119 |
| AXLE 6 RT. WEIGHT | 4 | 1 | 124 |
| AXLE 6 LT. WEIGHT | 4 | 1 | 129 |
| AXLE 5-6 SPACING | 4 | 1 | 134 |
| AXLE 7 RT. WEIGHT | 4 | 1 | 139 |
| AXLE 7 LT. WEIGHT | 4 | 1 | 144 |
| AXLE 6-7 SPACING | 4 | 1 | 149 |
| AXLE 8 RT. WEIGHT | 4 | 1 | 154 |
| AXLE 8 LT. WEIGHT | 4 | 1 | 159 |
| AXLE 7-8 SPACING | 4 | 1 | 164 |
| AXLE 9 RT. WEIGHT | 4 | 1 | 169 |
| AXLE 9 LT. WEIGHT | 4 | 1 | 174 |
| AXLE 8-9 SPACING | 4 | 1 | 179 |
| VENDOR SPECIFIC OPTIONAL FIELDS | | | 184 |

This file shall include every "truck record" contained in the daily data file. Each field shall be comma delimited and padded with blanks to complete the fixed logical record length.

For axle weight only weighing (in lieu of right and left wheel weighing), either the "AXLE n RT. WEIGHT" or the "AXLE n LT. WEIGHT" field may be used for the "AXLE n WEIGHT".

WEIGHT VIOLATION TABLE

(All weights in pounds)

AXLE WEIGHT

| | |
|------------|-------|
| Axle No. 1 | 12500 |
|------------|-------|

| | |
|-----------------|-------|
| All other axles | 20000 |
|-----------------|-------|

TANDEM AXLE WEIGHT

| | |
|---|-------|
| Two consecutive axles with an axle spacing not exceeding 8.4 feet | 34000 |
|---|-------|

GROSS VEHICLE WEIGHT

| | |
|--------------|-------|
| All vehicles | 80000 |
|--------------|-------|

BRIDGE WEIGHT

See following page

BRIDGE WEIGHT
Distance in nearest
whole foot between
the extremes of any
group of 2 or more
consecutive axles

| | 2 axles | 3 axles | 4 axles | 5 axles | 6 axles | 7 axles | 8 axles | 9 axles |
|-----|---------|---------|---------|---------|---------|---------|---------|---------|
| <8 | 34,000 | 34,000 | 34,000 | 34,000 | 34,000 | ———— | ———— | ———— |
| 8 | 34,000 | 34,000 | 34,000 | 34,000 | 34,000 | ———— | ———— | ———— |
| 9 | 39,000 | 42,500 | 42,500 | 42,500 | 42,500 | ———— | ———— | ———— |
| 10 | 40,000 | 43,500 | 43,500 | 43,500 | 43,500 | ———— | ———— | ———— |
| 11 | 40,000 | 44,000 | 44,000 | 44,000 | 44,000 | ———— | ———— | ———— |
| 12 | 40,000 | 45,000 | 50,000 | 50,000 | 50,000 | ———— | ———— | ———— |
| 13 | 40,000 | 45,500 | 50,500 | 50,500 | 50,500 | ———— | ———— | ———— |
| 14 | 40,000 | 46,500 | 51,500 | 51,500 | 51,500 | ———— | ———— | ———— |
| 15 | 40,000 | 47,000 | 52,000 | 52,000 | 52,000 | ———— | ———— | ———— |
| 16 | 40,000 | 48,000 | 52,500 | 52,500 | 52,500 | ———— | ———— | ———— |
| 17 | 40,000 | 48,500 | 53,500 | 53,500 | 53,500 | ———— | ———— | ———— |
| 18 | 40,000 | 49,500 | 54,000 | 54,000 | 54,000 | ———— | ———— | ———— |
| 19 | 40,000 | 50,000 | 54,500 | 54,500 | 54,500 | ———— | ———— | ———— |
| 20 | 40,000 | 51,000 | 55,500 | 55,500 | 55,500 | ———— | ———— | ———— |
| 21 | 40,000 | 51,500 | 56,000 | 56,000 | 56,000 | ———— | ———— | ———— |
| 22 | 40,000 | 52,500 | 56,500 | 56,500 | 56,500 | ———— | ———— | ———— |
| 23 | 40,000 | 53,000 | 57,500 | 57,500 | 57,500 | ———— | ———— | ———— |
| 24 | 40,000 | 54,000 | 58,000 | 58,000 | 58,000 | 74,000 | ———— | ———— |
| 25 | 40,000 | 54,500 | 58,500 | 58,500 | 58,500 | 74,500 | 80,000 | ———— |
| 26 | 40,000 | 55,500 | 59,500 | 59,500 | 59,500 | 75,000 | 80,000 | ———— |
| 27 | 40,000 | 56,000 | 60,000 | 60,000 | 60,000 | 76,000 | 80,000 | 80,000 |
| 28 | 40,000 | 57,000 | 60,500 | 60,500 | 60,500 | 76,500 | 80,000 | 80,000 |
| 29 | 40,000 | 57,500 | 61,500 | 61,500 | 61,500 | 77,000 | 80,000 | 80,000 |
| 30 | 40,000 | 58,500 | 62,000 | 62,000 | 62,000 | 77,500 | 80,000 | 80,000 |
| 31 | 40,000 | 59,000 | 62,500 | 62,500 | 62,500 | 78,000 | 80,000 | 80,000 |
| 32 | 40,000 | 60,000 | 63,500 | 63,500 | 63,500 | 78,500 | 80,000 | 80,000 |
| 33 | 40,000 | 60,000 | 64,000 | 64,000 | 64,000 | 79,500 | 80,000 | 80,000 |
| 34 | 40,000 | 60,000 | 64,500 | 64,500 | 64,500 | 80,000 | 80,000 | 80,000 |
| 35 | 40,000 | 60,000 | 65,500 | 65,500 | 65,500 | 80,000 | 80,000 | 80,000 |
| 36 | 40,000 | 60,000 | 68,000 | 66,000 | 66,000 | 80,000 | 80,000 | 80,000 |
| 37 | 40,000 | 60,000 | 68,000 | 66,500 | 66,500 | 80,000 | 80,000 | 80,000 |
| 38 | 40,000 | 60,000 | 68,000 | 67,500 | 67,500 | 80,000 | 80,000 | 80,000 |
| 39 | 40,000 | 60,000 | 68,000 | 68,000 | 68,000 | 80,000 | 80,000 | 80,000 |
| 40 | 40,000 | 60,000 | 68,500 | 70,000 | 70,000 | 80,000 | 80,000 | 80,000 |
| 41 | 40,000 | 60,000 | 69,500 | 72,000 | 72,000 | 80,000 | 80,000 | 80,000 |
| 42 | 40,000 | 60,000 | 70,000 | 73,280 | 73,280 | 80,000 | 80,000 | 80,000 |
| 43 | 40,000 | 60,000 | 70,500 | 73,280 | 73,280 | 80,000 | 80,000 | 80,000 |
| 44 | 40,000 | 60,000 | 71,500 | 73,280 | 73,280 | 80,000 | 80,000 | 80,000 |
| 45 | 40,000 | 60,000 | 72,000 | 76,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 46 | 40,000 | 60,000 | 72,500 | 76,500 | 80,000 | 80,000 | 80,000 | 80,000 |
| 47 | 40,000 | 60,000 | 73,500 | 77,500 | 80,000 | 80,000 | 80,000 | 80,000 |
| 48 | 40,000 | 60,000 | 74,000 | 78,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 49 | 40,000 | 60,000 | 74,500 | 78,500 | 80,000 | 80,000 | 80,000 | 80,000 |
| 50 | 40,000 | 60,000 | 75,500 | 79,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 51 | 40,000 | 60,000 | 76,000 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 52 | 40,000 | 60,000 | 76,500 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 53 | 40,000 | 60,000 | 77,500 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 54 | 40,000 | 60,000 | 78,000 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 55 | 40,000 | 60,000 | 78,500 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 56 | 40,000 | 60,000 | 79,500 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 57 | 40,000 | 60,000 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| 58 | 40,000 | 60,000 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |
| >58 | 40,000 | 60,000 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 | 80,000 |

Contract No. «Dist»-«Contract_No»

REAL TIME VIEW

Vehicle No.: _____ Class: _____ Lane: _____ Speed: _____

Time: _____ Date: _____ Vehicle Length: _____

Invalid Measurements Code: _____ Weight Violation(s): _____

| | TOTALS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------------------|--------|------|------|------|------|------|---|---|---|---|
| Axle Weight (kip) | 76.1 | 10.9 | 15.0 | 16.2 | 17.2 | 16.8 | | | | |
| Axle Space (feet) | 56.9 | 11.8 | 4.5 | 36.4 | 4.2 | | | | | |

Note: Entries following Axle Weight and Axle Space are for example purposes only.

TRUCK RECORD BATCH PRINT

Site Designation: _____ Lane: _____ Time: _____ Date: _____ Speed: _____

Vehicle No. _____ Class: _____ Invalid Code: _____ Veh. Wheelbase: _____ Veh. Length _____

Gross Wt. (kip): _____ Weight Violation(s): _____

| Axle No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----------------------|------|------|------|------|------|---|---|---|---|
| Rt. Wheel Wt. (kips) | 5.4 | 7.3 | 8.0 | 8.5 | 8.3 | | | | |
| Lt. Wheel Wt. (kips) | 5.5 | 7.7 | 8.2 | 8.7 | 8.5 | | | | |
| Axle Wt. (kips) | 10.9 | 15.0 | 16.2 | 17.2 | 16.8 | | | | |
| Axle Space (feet) | 11.8 | 4.5 | 36.4 | 4.2 | | | | | |

Note: Entries following Axle Wt. and Axle Space are for example purposes only.

DISTRIBUTION OF CLASS AND SPEED COUNTS BY LANE*

SITE DESIGNATION:

DATE:

| CLASS | LANE NUMBER <number of lanes varies with contract requirements> | | | | | | | | | | | |
|----------------|---|-------|-------|-------|-------|---|-------|---|-------|-------|-------|-------|
| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | |
| | COUNT | % | COUNT | % | COUNT | % | COUNT | % | COUNT | % | COUNT | % |
| 1 | 0 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 6 | 0.0 |
| 2 | 22521 | 82.4 | 24464 | 82.7 | | | | | 28540 | 90.6 | 23974 | 87.6 |
| 3 | 2687 | 9.8 | 2395 | 8.1 | | | | | 2324 | 7.4 | 1919 | 7.0 |
| 4 | 14 | 0.1 | 21 | 0.1 | | | | | 16 | 0.1 | 13 | 0.0 |
| 5 | 1152 | 4.2 | 1297 | 4.4 | | | | | 486 | 1.5 | 56 | 0.2 |
| 6 | 82 | 0.3 | 101 | 0.3 | | | | | 9 | 0.0 | 917 | 3.3 |
| 7 | 1 | 0.0 | 3 | 0.0 | | | | | 0 | 0.0 | 24 | 0.1 |
| 8 | 280 | 1.0 | 402 | 1.4 | | | | | 3 | 0.0 | 32 | 0.1 |
| 9 | 340 | 1.2 | 544 | 1.8 | | | | | 4 | 0.0 | 0 | 0.0 |
| 10 | 10 | 0.0 | 1 | 0.0 | | | | | 0 | 0.0 | 1 | 0.0 |
| 11 | 84 | 0.3 | 104 | 0.4 | | | | | 0 | 0.0 | 0 | 0.0 |
| 12 | 3 | 0.0 | 5 | 0.0 | | | | | 0 | 0.0 | 0 | 0.0 |
| 13 | 1 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 0 | 0.0 |
| 14 | 28 | 0.1 | 46 | 0.2 | | | | | 0 | 0.0 | 0 | 0.0 |
| 15 | 142 | 0.5 | 206 | 0.7 | | | | | 127 | 0.4 | 434 | 1.6 |
| TOTAL | 27337 | 100.0 | 29589 | 100.0 | | | | | 31509 | 100.0 | 27376 | 100.0 |
| SPEED (MPH) | | | | | | | | | | | | |
| 1-5 | 2 | 0.0 | 6 | 0.0 | | | | | 2 | 0.0 | 4 | 0.0 |
| 6-10 | 0 | 0.0 | 0 | 0.0 | | | | | 4 | 0.0 | 10 | 0.0 |
| 11-15 | 10 | 0.0 | 5 | 0.0 | | | | | 32 | 0.1 | 28 | 0.1 |
| 16-20 | 48 | 0.2 | 33 | 0.1 | | | | | 75 | 0.2 | 88 | 0.3 |
| 21-25 | 271 | 1.0 | 280 | 0.9 | | | | | 269 | 0.9 | 179 | 0.7 |
| 26-30 | 641 | 2.3 | 615 | 2.1 | | | | | 480 | 1.5 | 349 | 1.3 |
| 31-35 | 1047 | 3.8 | 838 | 2.8 | | | | | 731 | 2.3 | 606 | 2.2 |
| 36-40 | 1165 | 4.3 | 1073 | 3.6 | | | | | 1077 | 3.4 | 891 | 3.3 |
| 41-45 | 1645 | 6.0 | 913 | 3.1 | | | | | 927 | 2.9 | 997 | 3.6 |
| 46-50 | 5140 | 18.8 | 2063 | 7.0 | | | | | 1027 | 3.3 | 89 | 3.3 |
| 51-55 | 9487 | 34.7 | 5641 | 19.1 | | | | | 2508 | 8.0 | 1147 | 4.2 |
| 56-60 | 5613 | 20.5 | 13537 | 45.8 | | | | | 14134 | 44.9 | 3243 | 11.8 |
| 61-65 | 1872 | 6.8 | 3284 | 11.1 | | | | | 7211 | 22.9 | 9701 | 35.4 |
| 66-70 | 277 | 1.0 | 1170 | 4.0 | | | | | 2749 | 8.7 | 6614 | 24.2 |
| 71-75 | 79 | 0.3 | 90 | 0.3 | | | | | 234 | 0.7 | 2240 | 8.2 |
| 76-80 | 24 | 0.1 | 34 | 0.1 | | | | | 45 | 0.1 | 327 | 1.2 |
| 81-85 | 13 | 0.0 | 7 | 0.0 | | | | | 4 | 0.0 | 51 | 0.2 |
| 86-90 | 3 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 8 | 0.0 |
| 91-95 | 0 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 0 | 0.0 |
| 96-100 | 0 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 0 | 0.0 |
| >100 | 0 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 0 | 0.0 |
| TOTAL | 27337 | 100.0 | 29589 | 100.0 | | | | | 31509 | 100.0 | 27376 | 100.0 |
| AVG. SPEED | 51 | | 55 | | | | | | 57 | | 61 | |

* COUNT entries for example only

Contract No. «Dist»-«Contract_No»

DISTRIBUTION OF VEHICLE COUNTS BY HOUR OF DAY BY LANE

SITE DESIGNATION:

DATE:

| HOURLY SUMMARY | | LANE NUMBER <number varies with contract requirements> | | | | | |
|----------------|---|--|---|---|---|---|---------------|
| HOURLY | 1 | 2 | 3 | 4 | 5 | 6 | HOURLY TOTALS |
| 00-01 | | | | | | | |
| 01-02 | | | | | | | |
| 02-03 | | | | | | | |
| 03-04 | | | | | | | |
| 04-05 | | | | | | | |
| 05-06 | | | | | | | |
| QTR TOTALS | | | | | | | |
| | | | | | | | |
| 06-07 | | | | | | | |
| 07-08 | | | | | | | |
| 08-09 | | | | | | | |
| 09-10 | | | | | | | |
| 10-11 | | | | | | | |
| 11-12 | | | | | | | |
| QTR TOTALS | | | | | | | |
| | | | | | | | |
| 12-13 | | | | | | | |
| 13-14 | | | | | | | |
| 14-15 | | | | | | | |
| 15-16 | | | | | | | |
| 16-17 | | | | | | | |
| 17-18 | | | | | | | |
| QTR TOTALS | | | | | | | |
| | | | | | | | |
| 18-19 | | | | | | | |
| 19-20 | | | | | | | |
| 20-21 | | | | | | | |
| 21-22 | | | | | | | |
| 22-23 | | | | | | | |
| 23-24 | | | | | | | |
| QTR TOTALS | | | | | | | |
| | | | | | | | |
| DAILY SUMMARY | | DAILY COUNTS BY LANE | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | DAILY TOTALS |

DISTRIBUTION OF VEHICLE CLASSIFICATIONS BY HOUR OF DAY

SITE DESIGNATION:
DATE:

LANE NO's <display user's entry as to selected lane(s)>

HOURLY SUMMARY**VEHICLE COUNTS****HOURLY
TOTALS**

| <u>HOURLY</u> | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> | <u>15</u> | |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|
| 00-01 | | | | | | | | | | | | | | | | |
| 01-02 | | | | | | | | | | | | | | | | |
| 02-03 | | | | | | | | | | | | | | | | |
| 03-04 | | | | | | | | | | | | | | | | |
| 04-05 | | | | | | | | | | | | | | | | |
| <u>05-06</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> |

QTR TOTALS

| | | | | | | | | | | | | | | | | |
|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 06-07 | | | | | | | | | | | | | | | | |
| 07-08 | | | | | | | | | | | | | | | | |
| 08-09 | | | | | | | | | | | | | | | | |
| 09-10 | | | | | | | | | | | | | | | | |
| 10-11 | | | | | | | | | | | | | | | | |
| <u>11-12</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> |

QTR TOTALS

| | | | | | | | | | | | | | | | | |
|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 12-13 | | | | | | | | | | | | | | | | |
| 13-14 | | | | | | | | | | | | | | | | |
| 14-15 | | | | | | | | | | | | | | | | |
| 15-16 | | | | | | | | | | | | | | | | |
| 16-17 | | | | | | | | | | | | | | | | |
| <u>17-18</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> |

QTR TOTALS

| | | | | | | | | | | | | | | | | |
|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 18-19 | | | | | | | | | | | | | | | | |
| 19-20 | | | | | | | | | | | | | | | | |
| 20-21 | | | | | | | | | | | | | | | | |
| 21-22 | | | | | | | | | | | | | | | | |
| 22-23 | | | | | | | | | | | | | | | | |
| <u>23-24</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> | <u>—</u> |

QTR TOTALS

DAILY SUMMARY**VEHICLE COUNTS****TOTAL
VEHICLES**

| | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> | <u>15</u> | |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| COUNT | | | | | | | | | | | | | | | | |
| PERCENT | | | | | | | | | | | | | | | | |

DISTRIBUTION OF VEHICLE CLASSIFICATIONS BY DAY OF MONTH

SITE DESIGNATION:

LANE NO's <display user's entry as to selected lane(s)>

DATE: 01/92

| <u>VEHICLE COUNTS</u> | | | | | | | | | | | | | | | | |
|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|
| <u>DAILY SUMMARY</u> | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> | <u>15</u> | <u>TOTALS</u> |
| 1 WED | | | | | | | | | | | | | | | | |
| 2 THU | | | | | | | | | | | | | | | | |
| 3 FRI | | | | | | | | | | | | | | | | |
| <u>4 SAT</u> | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | - | | | | | | | | | | | | | | | |
| <u>DAILY AVG</u> | | | | | | | | | | | | | | | | |
| 5 SUN | | | | | | | | | | | | | | | | |
| 6 MON | | | | | | | | | | | | | | | | |
| 7 TUE | | | | | | | | | | | | | | | | |
| 8 WED | | | | | | | | | | | | | | | | |
| 9 THU | | | | | | | | | | | | | | | | |
| 10 FRI | | | | | | | | | | | | | | | | |
| <u>11 SAT</u> | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | - | | | | | | | | | | | | | | | |
| <u>DAILY AVG</u> | | | | | | | | | | | | | | | | |
| 12 SUN | | | | | | | | | | | | | | | | |
| 13 MON | | | | | | | | | | | | | | | | |
| 14 TUE | | | | | | | | | | | | | | | | |
| 15 WED | | | | | | | | | | | | | | | | |
| 16 THU | | | | | | | | | | | | | | | | |
| 17 FRI | | | | | | | | | | | | | | | | |
| <u>18 SAT</u> | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | - | | | | | | | | | | | | | | | |
| <u>DAILY AVG</u> | | | | | | | | | | | | | | | | |
| 19 SUN | | | | | | | | | | | | | | | | |
| 20 MON | | | | | | | | | | | | | | | | |
| 21 TUE | | | | | | | | | | | | | | | | |
| 22 WED | | | | | | | | | | | | | | | | |
| 23 THU | | | | | | | | | | | | | | | | |
| 24 FRI | | | | | | | | | | | | | | | | |
| <u>25 SAT</u> | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | - | | | | | | | | | | | | | | | |
| <u>DAILY AVG</u> | | | | | | | | | | | | | | | | |
| 26 SUN | | | | | | | | | | | | | | | | |
| 27 MON | | | | | | | | | | | | | | | | |
| 28 TUE | | | | | | | | | | | | | | | | |
| 29 WED | | | | | | | | | | | | | | | | |
| 30 THU | | | | | | | | | | | | | | | | |
| <u>31 FRI</u> | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | - | | | | | | | | | | | | | | | |
| <u>DAILY AVG</u> | | | | | | | | | | | | | | | | |

| | <u>VEHICLE COUNTS</u> | | | | | | | | | | | | | | | | |
|----------------|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|--|
| MONTHLY | | | | | | | | | | | | | | | | | |
| <u>SUMMARY</u> | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> | <u>15</u> | <u>TOTALS</u> | |
| TOTALS | | | | | | | | | | | | | | | | | |
| PERCENT | | | | | | | | | | | | | | | | | |
| DAILY AVG | | | | | | | | | | | | | | | | | |

DISTRIBUTION OF VEHICLES BY SPEED BY HOUR

SITE DESIGNATION

LANE NO's <display user's entry as to selected lane(s)>

DATE:

SPEED RANGE, MPH

HOUR

| <u>RANGE</u> | <u>00-30</u> | <u>31-35</u> | <u>36-40</u> | <u>41-45</u> | <u>46-50</u> | <u>51-55</u> | <u>56-60</u> | <u>61-65</u> | <u>66-70</u> | <u>71-75</u> | <u>76-80</u> | <u>> 80</u> |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|

00- 01

01- 02

02- 03

03- 04

04- 05

05- 06

QTR TOTALS

06- 07

07- 08

08- 09

09- 10

10- 11

11- 12

QTR TOTALS

12- 13

13- 14

14- 15

15- 16

16- 17

17- 18

QTR TOTALS

18- 19

19- 20

20- 21

21- 22

22- 23

23- 24

QTR TOTALSDAILY SPEED SUMMARY

Total Vehicles :

Total Vehicles > 55 MPH :

Percentage Vehicles > 55 MPH :

Average Speed :

Total Vehicles > 60 MPH :

Percentage Vehicles > 60 MPH :

Median Speed :

Total Vehicles > 65 MPH :

Percentage Vehicles > 65 MPH :

85th Percentile :

Total Vehicles > 70 MPH :

Percentage Vehicles > 70 MPH :

DISTRIBUTION OF TRUCK RECORD DATA BY LANE * <report to cover all records contained in truck records file>

SITE DESIGNATION:

DATE:

LANE NUMBER <number of lanes varies with contract requirements>

| CLASS | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | ALL LANES | |
|-------|-------|-------|-------|-------|-------|---|-------|---|-------|-------|-------|-------|-----------|-------|
| | COUNT | % | COUNT | % | COUNT | % | COUNT | % | COUNT | % | COUNT | % | COUNT | % |
| 1 | 0 | 0.0 | 0 | 0.0 | | | | | 0 | 0.0 | 6 | 0.0 | 6 | 0.0 |
| 2 | 0 | 0 | 0 | 0.0 | | | | | 0 | 0.0 | 0 | 0.0 | 0 | |
| 3 | 152 | 3.7 | 342 | 14.7 | | | | | 87 | 4.0 | 74 | 1.9 | 655 | 5.2 |
| 4 | 18 | 0.4 | 13 | 0.6 | | | | | 3 | 0.1 | 5 | 0.1 | 39 | 0.3 |
| 5 | 560 | 13.6 | 354 | 15.2 | | | | | 306 | 14.2 | 574 | 14.7 | 1794 | 14.3 |
| 6 | 129 | 3.1 | 67 | 2.9 | | | | | 66 | 3.1 | 104 | 2.7 | 366 | 2.9 |
| 7 | 3 | 0.1 | 0 | 0.0 | | | | | 0 | 0.0 | 27 | 0.7 | 30 | 0.2 |
| 8 | 350 | 8.5 | 134 | 8.8 | | | | | 278 | 12.9 | 357 | 9.1 | 1119 | 8.9 |
| 9 | 1775 | 43.1 | 918 | 39.4 | | | | | 961 | 44.4 | 1698 | 43.5 | 5352 | 42.7 |
| 10 | 3 | 0.1 | 1 | 0.0 | | | | | 4 | 0.2 | 4 | 0.1 | 12 | 0.1 |
| 11 | 783 | 19.0 | 332 | 14.2 | | | | | 302 | 14.0 | 754 | 19.3 | 2171 | 17.3 |
| 12 | 56 | 1.4 | 30 | 1.3 | | | | | 32 | 1.5 | 68 | 1.7 | 186 | 1.5 |
| 13 | 5 | 0.1 | 2 | 0.1 | | | | | 0 | 0.0 | 7 | 0.2 | 14 | 0.1 |
| 14 | 122 | 3.0 | 34 | 1.5 | | | | | 37 | 1.7 | 104 | 2.7 | 297 | 2.4 |
| 15 | 158 | 3.8 | 66 | 2.8 | | | | | 78 | 3.6 | 128 | 3.3 | 430 | 3.4 |
| TOTAL | 4121 | 100.0 | 2330 | 100.0 | | | | | 2161 | 100.0 | 3907 | 100.0 | 12520 | 100.0 |

* COUNT entries for example only

| STATUS | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | ALL LANES | |
|---------|-------|-------|-------|-------|-------|---|-------|---|-------|-------|-------|-------|-----------|-------|
| | COUNT | % | COUNT | % | COUNT | % | COUNT | % | COUNT | % | COUNT | % | COUNT | % |
| LEGAL | 3353 | 81.4 | 1866 | 80.1 | | | | | 1976 | 91.4 | 3076 | 78.7 | 10271 | 82.0 |
| OVR'WT | 662 | 16.0 | 384 | 16.5 | | | | | 127 | 5.9 | 715 | 18.3 | 2249 | 18.0 |
| INVALID | 106 | 2.6 | 80 | 3.4 | | | | | 59 | 2.7 | 116 | 3.0 | 361 | 2.9 |
| TOTAL | 4121 | 100.0 | 2330 | 100.0 | | | | | 2162 | 100.0 | 3907 | 100.0 | 12520 | 100.0 |

Note:

The line items under "STATUS" are to be based upon the Contractor's coding scheme for weight violation and invalid measurements. If the coding system identifies invalid measurements other than imbalance (such as "out-of-range" values, system errors, etc.), each unique type of invalid measurement should be broken down as a "STATUS" line item.

DISTRIBUTION OF WEIGHT VIOLATIONS AND INVALID MEASUREMENTS FOR VEHICLE
CLASSIFICATIONS 4 THROUGH 15

SITE DESIGNATION:
DATE:

LANE NO's <display user's entry as to selected lane(s)>

| CLASS | TOTAL VEHICLES COUNTED | VEHICLES WITH INVALID MEASUREMENTS | TOTAL VEHICLES WEIGHED | TOTAL VEHICLES OVERWT. | PERCENT VEHICLES OVERWT. | ***NUMBER OF*** | | | |
|--------|------------------------------|---|------------------------------|------------------------------|--------------------------------|-------------------------|--------|-------|--------|
| | | | | | | ***WEIGHT VIOLATIONS*** | | | |
| | | | | | | AXLE | TANDEM | GROSS | BRIDGE |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |
| 13 | | | | | | | | | |
| 14 | | | | | | | | | |
| 15 | | | | | | | | | |
| TOTALS | | | | | | | | | |

PERCENT VEHICLES NOT CLASSIFIED (CLASS 15): _____

PERCENT VEHICLES WITH INVALID MEASUREMENTS: _____

Notes:

"Percent Vehicles Not Classified" = Class 15 Total Vehicle Count / Total Vehicles Counted.

"Percent Vehicles With Invalid Measurements" = Total Vehicles With Invalid Measurements / Total Vehicles Counted.

"Vehicles Counted" - "Vehicles With Invalid Measurements" = "Vehicles Weighed"

All weight and weight violation reporting and calculations based on data for "weighed vehicles"

DISTRIBUTION OF WEIGHT VIOLATIONS BY HOUR OF DAY FOR VEHICLE CLASSIFICATIONS 4
THROUGH 14

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>
DATE:

HOURLY SUMMARY

*****NUMBER OF*****
*****WEIGHT VIOLATIONS*****

| <u>HOURLY</u> | <u>TOTAL</u> <u>VEHICLES</u> <u>WEIGHED</u> | <u>TOTAL</u> <u>VEHICLES</u> <u>OVERWEIGHT</u> | <u>PERCENT</u> <u>VEHICLES</u> <u>OVERWEIGHT</u> | <u>AXLE</u> | <u>TANDEM</u> | <u>GROSS</u> | <u>BRIDGE</u> |
|---------------|---|--|--|-------------------|-------------------|-------------------|-------------------|
| 00-01 | | | | | | | |
| 01-02 | | | | | | | |
| 02-03 | | | | | | | |
| 03-04 | | | | | | | |
| 04-05 | | | | | | | |
| <u>05-06</u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |
| QTR TOTALS | | | | | | | |

| | | | | | | | |
|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 06-07 | | | | | | | |
| 07-08 | | | | | | | |
| 08-09 | | | | | | | |
| 09-10 | | | | | | | |
| 10-11 | | | | | | | |
| <u>11-12</u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |
| QTR TOTALS | | | | | | | |

| | | | | | | | |
|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 12-13 | | | | | | | |
| 13-14 | | | | | | | |
| 14-15 | | | | | | | |
| 15-16 | | | | | | | |
| 16-17 | | | | | | | |
| <u>17-18</u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |
| QTR TOTALS | | | | | | | |

| | | | | | | | |
|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 18-19 | | | | | | | |
| 19-20 | | | | | | | |
| 20-21 | | | | | | | |
| 21-22 | | | | | | | |
| 22-23 | | | | | | | |
| <u>23-24</u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> | <u> </u> |
| QTR TOTALS | | | | | | | |

DAILY SUMMARY

*****NUMBER OF*****
*****WEIGHT VIOLATIONS*****

| | <u>TOTAL</u> <u>VEHICLES</u> <u>WEIGHED</u> | <u>TOTAL</u> <u>VEHICLES</u> <u>OVERWEIGHT</u> | <u>PERCENT</u> <u>VEHICLES</u> <u>OVERWEIGHT</u> | <u>AXLE</u> | <u>TANDEM</u> | <u>GROSS</u> | <u>BRIDGE</u> |
|--|---|--|--|-------------|---------------|--------------|---------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

DISTRIBUTION OF OVERWEIGHT VEHICLES BY HOUR OF DAY FOR VEHICLE CLASSIFICATIONS 4
THROUGH 14

SITE DESIGNATION: LANE NO's <display user's entry as to selected lane(s)>
 DATE: 01/92

HOURLY SUMMARY

NUMBER OVERWEIGHT VEHICLES

| | TOTAL VEH'S <u>WEIGHED</u> | TOTAL VEH'S <u>OVERWT</u> | PERCENT VEH'S <u>OVERWT</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> |
|--------------|----------------------------------|---------------------------------|-----------------------------------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|
| <u>HOUR</u> | | | | | | | | | | | | | | |
| 00-01 | | | | | | | | | | | | | | |
| 01-02 | | | | | | | | | | | | | | |
| 02-03 | | | | | | | | | | | | | | |
| 03-04 | | | | | | | | | | | | | | |
| 04-05 | | | | | | | | | | | | | | |
| <u>05-06</u> | _____ | _____ | _____ | — | — | — | — | — | — | — | — | — | — | — |

QTR TOTALS

| | | | | | | | | | | | | | | |
|--------------|-------|-------|-------|---|---|---|---|---|---|---|---|---|---|---|
| 06-07 | | | | | | | | | | | | | | |
| 07-08 | | | | | | | | | | | | | | |
| 08-09 | | | | | | | | | | | | | | |
| 09-10 | | | | | | | | | | | | | | |
| 10-11 | | | | | | | | | | | | | | |
| <u>11-12</u> | _____ | _____ | _____ | — | — | — | — | — | — | — | — | — | — | — |

QTR TOTALS

| | | | | | | | | | | | | | | |
|--------------|-------|-------|-------|---|---|---|---|---|---|---|---|---|---|---|
| 12-13 | | | | | | | | | | | | | | |
| 13-14 | | | | | | | | | | | | | | |
| 14-15 | | | | | | | | | | | | | | |
| 15-16 | | | | | | | | | | | | | | |
| 16-17 | | | | | | | | | | | | | | |
| <u>17-18</u> | _____ | _____ | _____ | — | — | — | — | — | — | — | — | — | — | — |

QTR TOTALS

| | | | | | | | | | | | | | | |
|--------------|-------|-------|-------|---|---|---|---|---|---|---|---|---|---|---|
| 18-19 | | | | | | | | | | | | | | |
| 19-20 | | | | | | | | | | | | | | |
| 20-21 | | | | | | | | | | | | | | |
| 21-22 | | | | | | | | | | | | | | |
| 22-23 | | | | | | | | | | | | | | |
| <u>23-24</u> | _____ | _____ | _____ | — | — | — | — | — | — | — | — | — | — | — |

QTR TOTALS

DAILY SUMMARY

NUMBER OVERWEIGHT VEHICLES

| | TOTAL VEH'S <u>WEIGHED</u> | TOTAL VEH'S <u>OVERWT</u> | PERCENT VEH'S <u>OVERWT</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> |
|--|----------------------------------|---------------------------------|-----------------------------------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|
|--|----------------------------------|---------------------------------|-----------------------------------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|

DISTRIBUTION OF GROSS WEIGHTS FOR VEHICLE CLASSIFICATIONS 4 THROUGH 14

SITE DESIGNATION:

LANE NO's <display user's entry as to selected lane(s)>

DATE:

| GROSS WT | | VEHICLE COUNTS | | | | | | | | | | | <u>TOTALS</u> |
|-------------|--|----------------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|---------------|
| <u>KIPS</u> | | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> | |
| 0-5 | | | | | | | | | | | | | |
| 5-10 | | | | | | | | | | | | | |
| 10-15 | | | | | | | | | | | | | |
| 15-20 | | | | | | | | | | | | | |
| 20-25 | | | | | | | | | | | | | |
| 25-30 | | | | | | | | | | | | | |
| 30-35 | | | | | | | | | | | | | |
| 35-40 | | | | | | | | | | | | | |
| 40-45 | | | | | | | | | | | | | |
| 45-50 | | | | | | | | | | | | | |
| 50-55 | | | | | | | | | | | | | |
| 55-60 | | | | | | | | | | | | | |
| 60-65 | | | | | | | | | | | | | |
| 65-70 | | | | | | | | | | | | | |
| 70-75 | | | | | | | | | | | | | |
| 75-80 | | | | | | | | | | | | | |
| 80-85 | | | | | | | | | | | | | |
| 85-90 | | | | | | | | | | | | | |
| 90-95 | | | | | | | | | | | | | |
| 95-100 | | | | | | | | | | | | | |
| 100-105 | | | | | | | | | | | | | |
| 105-110 | | | | | | | | | | | | | |
| 110-115 | | | | | | | | | | | | | |
| 115-120 | | | | | | | | | | | | | |
| >120 | | | | | | | | | | | | | |
| TOTALS | | | | | | | | | | | | | |

DISTRIBUTION OF 18 KIP ESALS BY HOUR OF DAY FOR VEHICLE CLASSIFICATIONS 4 THROUGH 14
FOR _____ <display user's entries as to pavement type and str. no. or slab thickness>

SITE DESIGNATION: _____ LANE NO's <display user's entry as to selected lane(s)>
DATE: _____ VEH STATUS <display user's entry as to "LEGAL ONLY", "OVWT ONLY"
or "ALL" (default)>

HOURLY SUMMARY

| <u>HOUR</u> | TOTAL VEH'S <u>WEIGHED</u> | TOTAL <u>ESALS</u> | ESALS BY HOUR BY CLASS | | | | | | | | | | | |
|--------------|----------------------------------|-----------------------|------------------------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|--|
| | | | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> | |
| 00-01 | | | | | | | | | | | | | | |
| 01-02 | | | | | | | | | | | | | | |
| 02-03 | | | | | | | | | | | | | | |
| 03-04 | | | | | | | | | | | | | | |
| 04-05 | | | | | | | | | | | | | | |
| <u>05-06</u> | _____ | _____ | — | — | — | — | — | — | — | — | — | — | — | |

QTR TOTALS

| | | | | | | | | | | | | | |
|--------------|-------|-------|---|---|---|---|---|---|---|---|---|---|---|
| 06-07 | | | | | | | | | | | | | |
| 07-08 | | | | | | | | | | | | | |
| 08-09 | | | | | | | | | | | | | |
| 09-10 | | | | | | | | | | | | | |
| 10-11 | | | | | | | | | | | | | |
| <u>11-12</u> | _____ | _____ | — | — | — | — | — | — | — | — | — | — | — |

QTR TOTALS

| | | | | | | | | | | | | | |
|--------------|-------|-------|---|---|---|---|---|---|---|---|---|---|---|
| 12-13 | | | | | | | | | | | | | |
| 13-14 | | | | | | | | | | | | | |
| 14-15 | | | | | | | | | | | | | |
| 15-16 | | | | | | | | | | | | | |
| 16-17 | | | | | | | | | | | | | |
| <u>17-18</u> | _____ | _____ | — | — | — | — | — | — | — | — | — | — | — |

QTR TOTALS

| | | | | | | | | | | | | | |
|--------------|-------|-------|---|---|---|---|---|---|---|---|---|---|---|
| 18-19 | | | | | | | | | | | | | |
| 19-20 | | | | | | | | | | | | | |
| 20-21 | | | | | | | | | | | | | |
| 21-22 | | | | | | | | | | | | | |
| 22-23 | | | | | | | | | | | | | |
| <u>23-24</u> | _____ | _____ | — | — | — | — | — | — | — | — | — | — | — |

QTR TOTALS

DAILY SUMMARY

| | <u>TOTALS</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> |
|----------------|---------------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|
| VEH'S WEIGHED: | | | | | | | | | | | | |
| 18 KIP ESALS: | | | | | | | | | | | | |
| AVERAGE ESAL: | | | | | | | | | | | | |

DISTRIBUTION OF TRUCKS BY DAY OF MONTH FOR CLASSIFICATIONS 4 THROUGH 15

SITE DESIGNATION:

LANE NO's <display user's entry as to selected lane(s)>

DATE: 01/92

DAILY SUMMARY

| | TOTAL | TOTAL | TOTAL | PCT | -----COUNTED VEHICLES----- | | | | | | | | | | | | | | |
|------------|-------------|-------------|-------------|-------------|----------------------------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|--|--|--|
| | VEHS | VEHS | VEHS | VEHS | - | | | | | | | | | | | | | | |
| <u>DAY</u> | <u>CNTD</u> | <u>WGHD</u> | <u>OVWT</u> | <u>OVWT</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> | <u>15</u> | | | |
| 01 WED | | | | | | | | | | | | | | | | | | | |
| 02 THU | | | | | | | | | | | | | | | | | | | |
| 03 FRI | | | | | | | | | | | | | | | | | | | |
| 04 SAT | | | | | | | | | | | | | | | | | | | |
| 05 SUN | | | | | | | | | | | | | | | | | | | |
| 06 MON | | | | | | | | | | | | | | | | | | | |
| 07 TUE | | | | | | | | | | | | | | | | | | | |
| 08 WED | | | | | | | | | | | | | | | | | | | |
| 09 THU | | | | | | | | | | | | | | | | | | | |
| 10 FRI | | | | | | | | | | | | | | | | | | | |
| 11 SAT | | | | | | | | | | | | | | | | | | | |
| 12 SUN | | | | | | | | | | | | | | | | | | | |
| 13 MON | | | | | | | | | | | | | | | | | | | |
| 14 TUE | | | | | | | | | | | | | | | | | | | |
| 15 WED | | | | | | | | | | | | | | | | | | | |
| 16 THU | | | | | | | | | | | | | | | | | | | |
| 17 FRI | | | | | | | | | | | | | | | | | | | |
| 18 SAT | | | | | | | | | | | | | | | | | | | |
| 19 SUN | | | | | | | | | | | | | | | | | | | |
| 20 MON | | | | | | | | | | | | | | | | | | | |
| 21 TUE | | | | | | | | | | | | | | | | | | | |
| 22 WED | | | | | | | | | | | | | | | | | | | |
| 23 THU | | | | | | | | | | | | | | | | | | | |
| 24 FRI | | | | | | | | | | | | | | | | | | | |
| 25 SAT | | | | | | | | | | | | | | | | | | | |
| 26 SUN | | | | | | | | | | | | | | | | | | | |
| 27 MON | | | | | | | | | | | | | | | | | | | |
| 28 TUE | | | | | | | | | | | | | | | | | | | |
| 29 WED | | | | | | | | | | | | | | | | | | | |
| 30 THU | | | | | | | | | | | | | | | | | | | |
| 31 FRI | | | | | | | | | | | | | | | | | | | |

MONTHLY SUMMARY

| | TOTAL | TOTAL | TOTAL | PCT | -----COUNTED VEHICLES----- | | | | | | | | | | | | | | |
|-------------------|-------------|-------------|-------------|-------------|----------------------------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|--|--|--|
| | VEHS | VEHS | VEHS | VEHS | | | | | | | | | | | | | | | |
| <u> </u> | <u>CNTD</u> | <u>WGHD</u> | <u>OVWT</u> | <u>OVWT</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> | <u>14</u> | <u>15</u> | | | |
| TOTALS | | | | | | | | | | | | | | | | | | | |
| PERCENT | | | | | | | | | | | | | | | | | | | |

Table D.4. Axle load equivalency factors for flexible pavements,
single axles and p 2.5

| Axle Load (kips) | Pavement Structural Number (SN) | | | | | |
|------------------------|---------------------------------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | .0004 | .0004 | .0003 | .0002 | .0002 | .0002 |
| 4 | .003 | .004 | .004 | .003 | .002 | .002 |
| 6 | .011 | .017 | .017 | .013 | .010 | .009 |
| 8 | .032 | .047 | .051 | .041 | .034 | .031 |
| 10 | .078 | .102 | .118 | .102 | .088 | .080 |
| 12 | .168 | .198 | .229 | .213 | .189 | .176 |
| 14 | .328 | .358 | .399 | .388 | .360 | .342 |
| 16 | .591 | .613 | .646 | .645 | .623 | .606 |
| 18 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.61 | 1.57 | 1.49 | 1.47 | 1.51 | 1.55 |
| 22 | 2.48 | 2.38 | 2.17 | 2.09 | 2.18 | 2.30 |
| 24 | 3.69 | 3.49 | 3.09 | 2.89 | 3.03 | 3.27 |
| 26 | 5.33 | 4.99 | 4.31 | 3.91 | 4.09 | 4.48 |
| 28 | 7.49 | 6.98 | 5.90 | 5.21 | 5.39 | 5.98 |
| 30 | 10.3 | 9.50 | 7.90 | 6.80 | 7.00 | 7.80 |
| 32 | 13.9 | 12.8 | 10.5 | 8.80 | 8.90 | 10.0 |
| 34 | 18.4 | 16.9 | 13.7 | 11.3 | 11.2 | 12.5 |
| 36 | 24.0 | 22.0 | 17.7 | 14.4 | 13.9 | 15.5 |
| 38 | 30.9 | 28.3 | 22.6 | 18.1 | 17.2 | 19.0 |
| 40 | 39.3 | 35.9 | 28.5 | 22.5 | 21.1 | 23.0 |
| 42 | 49.3 | 45.0 | 35.6 | 27.8 | 25.6 | 27.7 |
| 44 | 61.3 | 55.9 | 44.0 | 34.0 | 31.0 | 33.1 |
| 46 | 75.5 | 68.8 | 54.0 | 41.4 | 37.2 | 39.3 |
| 48 | 92.2 | 83.9 | 65.7 | 50.1 | 44.5 | 46.5 |
| 50 | 112. | 102. | 79. | 60. | 53. | 55. |

Table D.5. Axle load equivalency factors for flexible pavements,
tandem axles and p 2.5

| Axle Load (kips) | Pavement Structural Number (SN) | | | | | |
|------------------------|---------------------------------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | .0001 | .0001 | .0001 | .0000 | .0000 | .0000 |
| 4 | .0005 | .0005 | .0004 | .0003 | .0003 | .0002 |
| 6 | .002 | .002 | .002 | .001 | .001 | .001 |
| 8 | .004 | .006 | .005 | .004 | .003 | .003 |
| 10 | .008 | .013 | .011 | .009 | .007 | .006 |
| 12 | .015 | .024 | .023 | .018 | .014 | .013 |
| 14 | .026 | .041 | .042 | .033 | .027 | .024 |
| 16 | .044 | .065 | .070 | .057 | .047 | .043 |
| 18 | .070 | .097 | .109 | .092 | .077 | .070 |
| 20 | .107 | .141 | .162 | .141 | .121 | .110 |
| 22 | .160 | .198 | .229 | .207 | .180 | .166 |
| 24 | .231 | .273 | .315 | .292 | .260 | .242 |
| 26 | .327 | .370 | .420 | .401 | .364 | .342 |
| 28 | .451 | .493 | .548 | .534 | .495 | .470 |
| 30 | .611 | .648 | .703 | .695 | .658 | .633 |
| 32 | .813 | .843 | .889 | .887 | .857 | .834 |
| 34 | 1.06 | 1.08 | 1.11 | 1.11 | 1.09 | 1.08 |
| 36 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 | 1.38 |
| 38 | 1.75 | 1.73 | 1.69 | 1.68 | 1.70 | 1.73 |
| 40 | 2.21 | 2.16 | 2.06 | 2.03 | 2.08 | 2.14 |
| 42 | 2.76 | 2.67 | 2.49 | 2.43 | 2.51 | 2.61 |
| 44 | 3.41 | 3.27 | 2.99 | 2.88 | 3.00 | 3.16 |
| 46 | 4.18 | 3.98 | 3.58 | 3.40 | 3.55 | 3.79 |
| 48 | 5.08 | 4.80 | 4.25 | 3.98 | 4.17 | 4.49 |
| 50 | 6.12 | 5.76 | 5.03 | 4.64 | 4.86 | 5.28 |
| 52 | 7.33 | 6.87 | 5.93 | 5.38 | 5.63 | 6.17 |
| 54 | 8.72 | 8.14 | 6.95 | 6.22 | 6.47 | 7.15 |
| 56 | 10.3 | 9.6 | 8.1 | 7.2 | 7.4 | 8.2 |
| 58 | 12.1 | 11.3 | 9.4 | 8.2 | 8.4 | 9.4 |
| 60 | 14.2 | 13.1 | 10.9 | 9.4 | 9.6 | 10.7 |
| 62 | 16.5 | 15.3 | 12.6 | 10.7 | 10.8 | 12.1 |
| 64 | 19.1 | 17.6 | 14.5 | 12.2 | 12.2 | 13.7 |
| 66 | 22.1 | 20.3 | 16.6 | 13.8 | 13.7 | 15.4 |
| 68 | 25.3 | 23.3 | 18.9 | 15.6 | 15.4 | 17.2 |
| 70 | 29.0 | 26.6 | 21.5 | 17.6 | 17.2 | 19.2 |
| 72 | 33.0 | 30.3 | 24.4 | 19.8 | 19.2 | 21.3 |
| 74 | 37.5 | 34.4 | 27.6 | 22.2 | 21.3 | 23.6 |
| 76 | 42.5 | 38.9 | 31.1 | 24.8 | 23.7 | 26.1 |
| 78 | 48.0 | 43.9 | 35.0 | 27.8 | 26.2 | 28.8 |
| 80 | 54.0 | 49.4 | 39.2 | 30.9 | 29.0 | 31.7 |
| 82 | 60.6 | 55.4 | 43.9 | 34.4 | 32.0 | 34.8 |
| 84 | 67.8 | 61.9 | 49.0 | 38.2 | 35.3 | 38.1 |
| 86 | 75.7 | 69.1 | 54.5 | 42.3 | 38.8 | 41.7 |
| 88 | 84.3 | 76.9 | 60.6 | 46.8 | 42.6 | 45.6 |
| 90 | 93.7 | 85.4 | 67.1 | 51.7 | 46.8 | 49.7 |

Table D.6. Axle load equivalency factors for flexible pavements, triple axles and p 2.5

| Axle Load (kips) | Pavement Structural Number (SN) | | | | | |
|------------------|---------------------------------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | .0000 | .0000 | .0000 | .0000 | .0000 | .0000 |
| 4 | .0002 | .0002 | .0002 | .0001 | .0001 | .0001 |
| 6 | .0006 | .0007 | .0005 | .0004 | .0003 | .0003 |
| 8 | .001 | .002 | .001 | .001 | .001 | .001 |
| 10 | .003 | .004 | .003 | .002 | .002 | .002 |
| 12 | .005 | .007 | .006 | .004 | .003 | .003 |
| 14 | .008 | .012 | .010 | .008 | .006 | .006 |
| 16 | .012 | .019 | .018 | .013 | .011 | .010 |
| 18 | .018 | .029 | .028 | .021 | .017 | .016 |
| 20 | .027 | .042 | .042 | .032 | .027 | .024 |
| 22 | .038 | .058 | .060 | .048 | .040 | .036 |
| 24 | .053 | .078 | .084 | .068 | .057 | .051 |
| 26 | .072 | .103 | .114 | .095 | .080 | .072 |
| 28 | .098 | .133 | .151 | .128 | .109 | .099 |
| 30 | .129 | .169 | .195 | .170 | .145 | .133 |
| 32 | .169 | .213 | .247 | .220 | .191 | .175 |
| 34 | .219 | .266 | .308 | .281 | .246 | .228 |
| 36 | .279 | .329 | .379 | .352 | .313 | .292 |
| 38 | .352 | .403 | .461 | .436 | .393 | .368 |
| 40 | .439 | .491 | .554 | .533 | .487 | .459 |
| 42 | .543 | .594 | .661 | .644 | .597 | .567 |
| 44 | .666 | .714 | .781 | .769 | .723 | .692 |
| 46 | .811 | .854 | .918 | .911 | .868 | .838 |
| 48 | .979 | 1.015 | 1.072 | 1.069 | 1.033 | 1.005 |
| 50 | 1.17 | 1.20 | 1.24 | 1.25 | 1.22 | 1.20 |
| 52 | 1.40 | 1.41 | 1.44 | 1.44 | 1.43 | 1.41 |
| 54 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 | 1.66 |
| 56 | 1.95 | 1.93 | 1.90 | 1.90 | 1.91 | 1.93 |
| 58 | 2.29 | 2.25 | 2.17 | 2.16 | 2.20 | 2.24 |
| 60 | 2.67 | 2.60 | 2.48 | 2.44 | 2.51 | 2.58 |
| 62 | 3.09 | 3.00 | 2.82 | 2.76 | 2.85 | 2.95 |
| 64 | 3.57 | 3.44 | 3.19 | 3.10 | 3.22 | 3.36 |
| 66 | 4.11 | 3.94 | 3.61 | 3.47 | 3.62 | 3.81 |
| 68 | 4.71 | 4.49 | 4.06 | 3.88 | 4.05 | 4.30 |
| 70 | 5.38 | 5.11 | 4.57 | 4.32 | 4.52 | 4.84 |
| 72 | 6.12 | 5.79 | 5.13 | 4.80 | 5.03 | 5.41 |
| 74 | 6.93 | 6.54 | 5.74 | 5.32 | 5.57 | 6.04 |
| 76 | 7.84 | 7.37 | 6.41 | 5.88 | 6.15 | 6.71 |
| 78 | 8.83 | 8.28 | 7.14 | 6.49 | 6.78 | 7.43 |
| 80 | 9.92 | 9.28 | 7.95 | 7.15 | 7.45 | 8.21 |
| 82 | 11.1 | 10.4 | 8.8 | 7.9 | 8.2 | 9.0 |
| 84 | 12.4 | 11.6 | 9.8 | 8.6 | 8.9 | 9.9 |
| 86 | 13.8 | 12.9 | 10.8 | 9.5 | 9.8 | 10.9 |
| 88 | 15.4 | 14.3 | 11.9 | 10.4 | 10.6 | 11.9 |
| 90 | 17.1 | 15.8 | 13.2 | 11.3 | 11.6 | 12.9 |

Table D.13. Axle load equivalency factors for rigid pavements, single axles and p of 2.5

| Axle Load (kips) | Slab Thickness, D (inches) | | | | | | | | |
|------------------------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 2 | .0002 | .0002 | .0002 | .0002 | .0002 | .0002 | .0002 | .0002 | .0002 |
| 4 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 |
| 6 | .012 | .011 | .010 | .010 | .010 | .010 | .010 | .010 | .010 |
| 8 | .039 | .035 | .033 | .032 | .032 | .032 | .032 | .032 | .032 |
| 10 | .097 | .089 | .084 | .082 | .081 | .080 | .080 | .080 | .080 |
| 12 | .203 | .189 | .181 | .176 | .175 | .174 | .174 | .173 | .173 |
| 14 | .376 | .360 | .347 | .341 | .338 | .337 | .336 | .336 | .336 |
| 16 | .634 | .623 | .610 | .604 | .601 | .599 | .599 | .599 | .599 |
| 18 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 20 | 1.51 | 1.52 | 1.55 | 1.57 | 1.58 | 1.58 | 1.59 | 1.59 | 1.59 |
| 22 | 2.21 | 2.20 | 2.28 | 2.34 | 2.38 | 2.40 | 2.41 | 2.41 | 2.41 |
| 24 | 3.16 | 3.10 | 3.22 | 3.36 | 3.45 | 3.50 | 3.53 | 3.54 | 3.55 |
| 26 | 4.41 | 4.26 | 4.42 | 4.67 | 4.85 | 4.95 | 5.01 | 5.04 | 5.05 |
| 28 | 6.05 | 5.76 | 5.92 | 6.29 | 6.61 | 6.81 | 6.92 | 6.98 | 7.01 |
| 30 | 8.16 | 7.67 | 7.79 | 8.28 | 8.79 | 9.14 | 9.35 | 9.46 | 9.52 |
| 32 | 10.8 | 10.1 | 10.1 | 10.7 | 11.4 | 12.0 | 12.3 | 12.6 | 12.7 |
| 34 | 14.1 | 13.0 | 12.9 | 13.6 | 14.6 | 15.4 | 16.0 | 16.4 | 16.5 |
| 36 | 18.2 | 16.7 | 16.4 | 17.1 | 18.3 | 19.5 | 20.4 | 21.0 | 21.3 |
| 38 | 23.1 | 21.1 | 20.6 | 21.3 | 22.7 | 24.3 | 25.6 | 26.4 | 27.0 |
| 40 | 29.1 | 26.5 | 25.7 | 26.3 | 27.9 | 29.9 | 31.6 | 32.9 | 33.7 |
| 42 | 36.2 | 32.9 | 31.7 | 32.2 | 34.0 | 36.3 | 38.7 | 40.4 | 41.6 |
| 44 | 44.6 | 40.4 | 38.8 | 39.2 | 41.0 | 43.8 | 46.7 | 49.1 | 50.8 |
| 46 | 54.5 | 49.3 | 47.1 | 47.3 | 49.2 | 52.3 | 55.9 | 59.0 | 61.4 |
| 48 | 66.1 | 59.7 | 56.9 | 56.8 | 58.7 | 62.1 | 66.3 | 70.3 | 73.4 |
| 50 | 79.4 | 71.7 | 68.2 | 67.8 | 69.6 | 73.3 | 78.1 | 83.0 | 87.1 |

Table D.14. Axle load equivalency factors for rigid pavements, tandem axles and p of 2.5

| Axle Load (kips) | Slab Thickness, D (inches) | | | | | | | | |
|------------------------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 2 | .0001 | .0001 | .0001 | .0001 | .0001 | .0001 | .0001 | .0001 | .0001 |
| 4 | .0006 | .0006 | .0005 | .0005 | .0005 | .0005 | .0005 | .0005 | .0005 |
| 6 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 |
| 8 | .007 | .006 | .006 | .005 | .005 | .005 | .005 | .005 | .005 |
| 10 | .015 | .014 | .013 | .013 | .012 | .012 | .012 | .012 | .012 |
| 12 | .031 | .028 | .026 | .026 | .025 | .025 | .025 | .025 | .025 |
| 14 | .057 | .052 | .049 | .048 | .047 | .047 | .047 | .047 | .047 |
| 16 | .097 | .089 | .084 | .082 | .081 | .081 | .080 | .080 | .080 |
| 18 | .155 | .143 | .136 | .133 | .132 | .131 | .131 | .131 | .131 |
| 20 | .234 | .220 | .211 | .206 | .204 | .203 | .203 | .203 | .203 |
| 22 | .340 | .325 | .313 | .308 | .305 | .304 | .303 | .303 | .303 |
| 24 | .475 | .462 | .450 | .444 | .441 | .440 | .439 | .439 | .439 |
| 26 | .644 | .637 | .627 | .622 | .620 | .619 | .618 | .618 | .618 |
| 28 | .855 | .854 | .852 | .850 | .850 | .850 | .849 | .849 | .849 |
| 30 | 1.11 | 1.12 | 1.13 | 1.14 | 1.14 | 1.14 | 1.14 | 1.14 | 1.14 |
| 32 | 1.43 | 1.44 | 1.47 | 1.49 | 1.50 | 1.51 | 1.51 | 1.51 | 1.51 |
| 34 | 1.82 | 1.82 | 1.87 | 1.92 | 1.95 | 1.96 | 1.97 | 1.97 | 1.97 |
| 36 | 2.29 | 2.27 | 2.35 | 2.43 | 2.48 | 2.51 | 2.52 | 2.52 | 2.53 |
| 38 | 2.85 | 2.80 | 2.91 | 3.03 | 3.12 | 3.16 | 3.18 | 3.20 | 3.20 |
| 40 | 3.52 | 3.42 | 3.55 | 3.74 | 3.87 | 3.94 | 3.98 | 4.00 | 4.01 |
| 42 | 4.32 | 4.16 | 4.30 | 4.55 | 4.74 | 4.86 | 4.91 | 4.95 | 4.96 |
| 44 | 5.26 | 5.01 | 5.16 | 5.48 | 5.75 | 5.92 | 6.01 | 6.06 | 6.09 |
| 46 | 6.36 | 6.01 | 6.14 | 6.53 | 6.90 | 7.14 | 7.28 | 7.36 | 7.40 |
| 48 | 7.64 | 7.16 | 7.27 | 7.73 | 8.21 | 8.55 | 8.75 | 8.86 | 8.92 |
| 50 | 9.11 | 8.50 | 8.55 | 9.07 | 9.68 | 10.14 | 10.42 | 10.58 | 10.66 |
| 52 | 10.8 | 10.0 | 10.0 | 10.6 | 11.3 | 11.9 | 12.3 | 12.5 | 12.7 |
| 54 | 12.8 | 11.8 | 11.7 | 12.3 | 13.2 | 13.9 | 14.5 | 14.8 | 14.9 |
| 56 | 15.0 | 13.8 | 13.6 | 14.2 | 15.2 | 16.2 | 16.8 | 17.3 | 17.5 |
| 58 | 17.5 | 16.0 | 15.7 | 16.3 | 17.5 | 18.6 | 19.5 | 20.1 | 20.4 |
| 60 | 20.3 | 18.5 | 18.1 | 18.7 | 20.0 | 21.4 | 22.5 | 23.2 | 23.6 |
| 62 | 23.5 | 21.4 | 20.8 | 21.4 | 22.8 | 24.4 | 25.7 | 26.7 | 27.3 |
| 64 | 27.0 | 24.6 | 23.8 | 24.4 | 25.8 | 27.7 | 29.3 | 30.5 | 31.3 |
| 66 | 31.0 | 28.1 | 27.1 | 27.6 | 29.2 | 31.3 | 33.2 | 34.7 | 35.7 |
| 68 | 35.4 | 32.1 | 30.9 | 31.3 | 32.9 | 35.2 | 37.5 | 39.3 | 40.5 |
| 70 | 40.3 | 36.5 | 35.0 | 35.3 | 37.0 | 39.5 | 42.1 | 44.3 | 45.9 |
| 72 | 45.7 | 41.4 | 39.6 | 39.8 | 41.5 | 44.2 | 47.2 | 49.8 | 51.7 |
| 74 | 51.7 | 46.7 | 44.6 | 44.7 | 46.4 | 49.3 | 52.7 | 55.7 | 58.0 |
| 76 | 58.3 | 52.6 | 50.2 | 50.1 | 51.8 | 54.9 | 58.6 | 62.1 | 64.8 |
| 78 | 65.5 | 59.1 | 56.3 | 56.1 | 57.7 | 60.9 | 65.0 | 69.0 | 72.3 |
| 80 | 73.4 | 66.2 | 62.9 | 62.5 | 64.2 | 67.5 | 71.9 | 76.4 | 80.2 |
| 82 | 82.0 | 73.9 | 70.2 | 69.6 | 71.2 | 74.7 | 79.4 | 84.4 | 88.8 |
| 84 | 91.4 | 82.4 | 78.1 | 77.3 | 78.9 | 82.4 | 87.4 | 93.0 | 98.1 |
| 86 | 102. | 92. | 87. | 86. | 87. | 91. | 96. | 102. | 108. |
| 88 | 113. | 102. | 96.0 | 95.0 | 96.0 | 100. | 105. | 112. | 119. |
| 90 | 125. | 112. | 106. | 105. | 106. | 110. | 115. | 123. | 130. |

Table D.15. Axle load equivalency factors for rigid pavements, triple axles and p of 2.5

| Axle Load (kips) | Slab Thickness, D (inches) | | | | | | | | |
|------------------------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 2 | .0001 | .0001 | .0001 | .0001 | .0001 | .0001 | .0001 | .0001 | .0001 |
| 4 | .0003 | .0003 | .0003 | .0003 | .0003 | .0003 | .0003 | .0003 | .0003 |
| 6 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 | .001 |
| 8 | .003 | .002 | .002 | .002 | .002 | .002 | .002 | .002 | .002 |
| 10 | .006 | .005 | .005 | .005 | .005 | .005 | .005 | .005 | .005 |
| 12 | .011 | .010 | .010 | .009 | .009 | .009 | .009 | .009 | .009 |
| 14 | .020 | .018 | .017 | .017 | .016 | .016 | .016 | .016 | .016 |
| 16 | .033 | .030 | .029 | .028 | .027 | .027 | .027 | .027 | .027 |
| 18 | .053 | .048 | .045 | .044 | .044 | .043 | .043 | .043 | .043 |
| 20 | .080 | .073 | .069 | .067 | .066 | .066 | .066 | .066 | .066 |
| 22 | .116 | .107 | .101 | .099 | .098 | .097 | .097 | .097 | .097 |
| 24 | .163 | .151 | .144 | .141 | .139 | .139 | .138 | .138 | .138 |
| 26 | .222 | .209 | .200 | .195 | .194 | .193 | .192 | .192 | .192 |
| 28 | .295 | .281 | .271 | .265 | .263 | .262 | .262 | .262 | .262 |
| 30 | .384 | .371 | .359 | .354 | .351 | .350 | .349 | .349 | .349 |
| 32 | .490 | .480 | .468 | .463 | .460 | .459 | .458 | .458 | .458 |
| 34 | .616 | .609 | .601 | .596 | .594 | .593 | .592 | .592 | .592 |
| 36 | .765 | .762 | .759 | .757 | .756 | .755 | .755 | .755 | .755 |
| 38 | .939 | .941 | .946 | .948 | .950 | .951 | .951 | .951 | .951 |
| 40 | 1.14 | 1.15 | 1.16 | 1.17 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 |
| 42 | 1.38 | 1.38 | 1.41 | 1.44 | 1.45 | 1.46 | 1.46 | 1.46 | 1.46 |
| 44 | 1.65 | 1.65 | 1.70 | 1.74 | 1.77 | 1.78 | 1.78 | 1.78 | 1.79 |
| 46 | 1.97 | 1.96 | 2.03 | 2.09 | 2.13 | 2.15 | 2.16 | 2.16 | 2.16 |
| 48 | 2.34 | 2.31 | 2.40 | 2.49 | 2.55 | 2.58 | 2.59 | 2.60 | 2.60 |
| 50 | 2.76 | 2.71 | 2.81 | 2.94 | 3.02 | 3.07 | 3.09 | 3.10 | 3.11 |
| 52 | 3.24 | 3.15 | 3.27 | 3.44 | 3.56 | 3.62 | 3.66 | 3.68 | 3.68 |
| 54 | 3.79 | 3.66 | 3.79 | 4.00 | 4.16 | 4.26 | 4.30 | 4.33 | 4.34 |
| 56 | 4.41 | 4.23 | 4.37 | 4.63 | 4.84 | 4.97 | 5.03 | 5.07 | 5.09 |
| 58 | 5.12 | 4.87 | 5.00 | 5.32 | 5.59 | 5.76 | 5.85 | 5.90 | 5.93 |
| 60 | 5.91 | 5.59 | 5.71 | 6.08 | 6.42 | 6.64 | 6.77 | 6.84 | 6.87 |
| 62 | 6.80 | 6.39 | 6.50 | 6.91 | 7.33 | 7.62 | 7.79 | 7.88 | 7.93 |
| 64 | 7.79 | 7.29 | 7.37 | 7.82 | 8.33 | 8.70 | 8.92 | 9.04 | 9.11 |
| 66 | 8.90 | 8.28 | 8.33 | 8.83 | 9.42 | 9.88 | 10.17 | 10.33 | 10.42 |
| 68 | 10.1 | 9.4 | 9.4 | 9.9 | 10.6 | 11.2 | 11.5 | 11.7 | 11.9 |
| 70 | 11.5 | 10.6 | 10.6 | 11.1 | 11.9 | 12.6 | 13.0 | 13.3 | 13.5 |
| 72 | 13.0 | 12.0 | 11.8 | 12.4 | 13.3 | 14.1 | 14.7 | 15.0 | 15.2 |
| 74 | 14.6 | 13.5 | 13.2 | 13.8 | 14.8 | 15.8 | 16.5 | 16.9 | 17.1 |
| 76 | 16.5 | 15.1 | 14.8 | 15.4 | 16.5 | 17.6 | 18.4 | 18.9 | 19.2 |
| 78 | 18.5 | 16.9 | 16.5 | 17.1 | 18.2 | 19.5 | 20.5 | 21.1 | 21.5 |
| 80 | 20.6 | 18.8 | 18.3 | 18.9 | 20.2 | 21.6 | 22.7 | 23.5 | 24.0 |
| 82 | 23.0 | 21.0 | 20.3 | 20.9 | 22.2 | 23.8 | 25.2 | 26.1 | 26.7 |
| 84 | 25.6 | 23.3 | 22.5 | 23.1 | 24.5 | 26.2 | 27.8 | 28.9 | 29.6 |
| 86 | 28.4 | 25.8 | 24.9 | 25.4 | 26.9 | 28.8 | 30.5 | 31.9 | 32.8 |
| 88 | 31.5 | 28.6 | 27.5 | 27.9 | 29.4 | 31.5 | 33.5 | 35.1 | 36.1 |
| 90 | 34.8 | 31.5 | 30.3 | 30.7 | 32.2 | 34.4 | 36.7 | 38.5 | 39.8 |

SECTION 11. MODIFIED STANDARD SPECIFICATION SECTIONS**SECTION 11-1. (BLANK)****SECTION 11-2. PORTLAND CEMENT CONCRETE**

Contract No. «Dist»-«Contract_No»

11-2.01 GENERAL

Portland cement concrete shall conform to the provisions in this Section 11-2, "Portland Cement Concrete," and the section entitled "Portland Cement Concrete" in Section 8, "Materials," of these special provisions. Section 90, "Portland Cement Concrete," of the Standard Specifications is deleted. Section 90, "Portland Cement Concrete," of the Standard Specifications is amended to read as follows.

SECTION 90: PORTLAND CEMENT CONCRETE

90-1 GENERAL

90-1.01 DESCRIPTION

- Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.
- The Contractor shall determine the mix proportions for all concrete except pavement concrete. The Engineer will determine the mix proportions for pavement concrete. Concrete for which the mix proportions are determined either by the Contractor or the Engineer shall conform to the requirements of this Section 90.
- Unless otherwise specified, cementitious material shall be a combination of cement and mineral admixture. Cementitious material shall be either:
 1. "Type IP (MS) Modified" cement; or
 2. A combination of "Type II Modified" portland cement and mineral admixture; or
 3. A combination of Type V portland cement and mineral admixture.
- Type III portland cement shall be used only as allowed in the special provisions or with the approval of the Engineer.
- Class 1 concrete shall contain not less than 400 kg of cementitious material per cubic meter.
- Class 2 concrete shall contain not less than 350 kg of cementitious material per cubic meter.
- Class 3 concrete shall contain not less than 300 kg of cementitious material per cubic meter.
- Class 4 concrete shall contain not less than 250 kg of cementitious material per cubic meter.
- Minor concrete shall contain not less than 325 kg of cementitious material per cubic meter unless otherwise specified in these specifications or the special provisions.
- Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic meter of concrete in structures or portions of structures shall conform to the following:

| Use | Cementitious Material Content (kg/m ³) |
|--|---|
| Concrete designated by compressive strength: | |
| Deck slabs and slab spans of bridges | 400 min., 475 max. |
| Roof sections of exposed top box culverts | 400 min., 475 max. |
| Other portions of structures | 350 min., 475 max. |
| Concrete not designated by compressive strength: | |
| Deck slabs and slab spans of bridges | 400 min. |
| Roof sections of exposed top box culverts | 400 min. |
| Prestressed members | 400 min. |
| Seal courses | 400 min. |
| Other portions of structures | 350 min. |
| Concrete for precast members | 350 min., 550 max. |

- Whenever the 28-day compressive strength shown on the plans is greater than 25 MPa, the concrete shall be designated by compressive strength. If the plans show a 28-day compressive strength that is 28 MPa or greater, an additional 14 days will be allowed to obtain the specified strength. The 28-day compressive strengths shown on the plans that are 25 MPa or less are shown for design information only and are not a requirement for acceptance of the concrete.
- Concrete designated by compressive strength shall be proportioned such that the concrete will attain the strength shown on the plans or specified in the special provisions.
- Before using concrete for which the mix proportions have been determined by the Contractor, or in advance of revising those mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.

- Compliance with cementitious material content requirements will be verified in conformance with procedures described in California Test 518 for cement content. For testing purposes, mineral admixture shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.
- If any concrete has a cementitious material, portland cement, or mineral admixture content that is less than the minimum required, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to the State \$0.55 for each kilogram of cementitious material, portland cement, or mineral admixture that is less than the minimum required. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions will be made based on the results of California Test 518.
- The requirements of the preceding paragraph shall not apply to minor concrete or commercial quality concrete.

90-2 MATERIALS

90-2.01 CEMENT

- Unless otherwise specified, cement shall be either "Type IP (MS) Modified" cement, "Type II Modified" portland cement or Type V portland cement.
- "Type IP (MS) Modified" cement shall conform to the requirements for Type IP (MS) cement in ASTM Designation: C 595, and shall be comprised of an intimate and uniform blend of Type II cement and not more than 35 percent by mass of mineral admixture. The type and minimum amount of mineral admixture used in the manufacture of "Type IP (MS) Modified" cement shall be in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."
- "Type II Modified" portland cement shall conform to the requirements for Type II portland cement in ASTM Designation: C 150.
- In addition, "Type IP (MS) Modified" cement and "Type II Modified" portland cement shall conform to the following requirements:
 - A. The cement shall not contain more than 0.60 percent by mass of alkalis, calculated as the percentage of Na_2O plus 0.658 times the percentage of K_2O , when determined by either direct intensity flame photometry or by the atomic absorption method. The instrument and procedure used shall be qualified as to precision and accuracy in conformance with the requirements in ASTM Designation: C 114;
 - B. The autoclave expansion shall not exceed 0.50 percent; and
 - C. Mortar, containing the cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not expand in water more than 0.010 percent and shall not contract in air more than 0.048 percent, except that when cement is to be used for precast prestressed concrete piling, precast prestressed concrete members, or steam cured concrete products, the mortar shall not contract in air more than 0.053 percent.
- Type III and Type V portland cements shall conform to the requirements in ASTM Designation: C 150 and the additional requirements listed above for "Type II Modified" portland cement, except that when tested in conformance with California Test 527, mortar containing Type III portland cement shall not contract in air more than 0.075 percent.
- Cement used in the manufacture of cast-in-place concrete for exposed surfaces of like elements of a structure shall be from the same cement mill.
- Cement shall be protected from exposure to moisture until used. Sacked cement shall be piled to permit access for tally, inspection, and identification of each shipment.
- Adequate facilities shall be provided to assure that cement meeting the provisions specified in this Section 90-2.01 shall be kept separate from other cement in order to prevent any but the specified cement from entering the work. Safe and suitable facilities for sampling cement shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper, in conformance with California Test 125.
- If cement is used prior to sampling and testing as provided in Section 6-1.07, "Certificates of Compliance," and the cement is delivered directly to the site of the work, the Certificate of Compliance shall be signed by the cement manufacturer or supplier of the cement. If the cement is used in ready-mixed concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product.
- Cement furnished without a Certificate of Compliance shall not be used in the work until the Engineer has had sufficient time to make appropriate tests and has approved the cement for use.

90-2.02 AGGREGATES

- Aggregates shall be free from deleterious coatings, clay balls, roots, bark, sticks, rags, and other extraneous material.
- Natural aggregates shall be thoroughly and uniformly washed before use.
- The Contractor, at the Contractor's expense, shall provide safe and suitable facilities, including necessary splitting devices for obtaining samples of aggregates, in conformance with California Test 125.
- Aggregates shall be of such character that it will be possible to produce workable concrete within the limits of water content provided in Section 90-6.06, "Amount of Water and Penetration."
- Aggregates shall have not more than 10 percent loss when tested for soundness in conformance with the requirements in California Test 214. The soundness requirement for fine aggregate will be waived, provided that the durability index, D_f , of the fine aggregate is 60, or greater, when tested for durability in conformance with California Test 229.
- If the results of any one or more of the Cleanness Value, Sand Equivalent, or aggregate grading tests do not meet the requirements specified for "Operating Range" but all meet the "Contract Compliance" requirements, the placement of concrete shall be suspended at the completion of the current pour until tests or other information indicate that the next material to be used in the work will comply with the requirements specified for "Operating Range."
- If the results of either or both the Cleanness Value and coarse aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete that is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State \$4.60 per cubic meter for paving concrete and \$7.20 per cubic meter for all other concrete for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.
- If the results of either or both the Sand Equivalent and fine aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete which is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State \$4.60 per cubic meter for paving concrete and \$7.20 per cubic meter for all other concrete for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.
- The 2 preceding paragraphs apply individually to the "Contract Compliance" requirements for coarse aggregate and fine aggregate. When both coarse aggregate and fine aggregate do not conform to the "Contract Compliance" requirements, both paragraphs shall apply. The payments specified in those paragraphs shall be in addition to any payments made in conformance with the provisions in Section 90-1.01, "Description."
- No single Cleanness Value, Sand Equivalent or aggregate grading test shall represent more than 250 m³ of concrete or one day's pour, whichever is smaller.
- Aggregates specified for freeze-thaw resistance shall pass the freezing and thawing test, California Test 528.
- The Contractor shall notify the Engineer of the proposed source of freeze-thaw resistant concrete aggregates at least 4 months before intended use. Should the Contractor later propose a different source of concrete aggregates, the Contractor shall again notify the Engineer at least 4 months before intended use. Blending of fine or coarse aggregates from untested sources with acceptable aggregates will not be permitted. Provisions for the time of submission of samples as provided in Section 40-1.015, "Cement Content," are superseded by the foregoing.
- Concurrently with notification of proposed sources of freeze-thaw resistant concrete aggregates, the Contractor shall furnish samples in the quantity ordered by the Engineer. The samples shall be secured under the direct supervision of the Engineer. Samples from existing stockpiles of processed aggregate shall be taken from washed materials and shall be visibly damp. Samples from materials in place in a material source shall be taken at depths from the existing surface that will ensure the presence of the full quantity of ground water. Excavations for the purpose of securing samples shall be made to the full depth of intended source operations. Samples shall be protected against loss of contained water until they are delivered to the Engineer.
- The Engineer will waive the above freeze-thaw test and the 4-month advance notice, required in this Section, provided aggregates are to be obtained from sources that have previously passed this test and test results are currently applicable.
- No extension of contract time will be allowed for the time required to perform the freezing and thawing test.
- When the source of an aggregate is changed, except for pavement concrete, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using the aggregates. When the source of an aggregate is changed for pavement concrete, the Engineer shall be allowed sufficient time to adjust the mix, and the aggregates shall not be used until necessary adjustments are made.

90-2.02A Coarse Aggregate

- Coarse aggregate shall consist of gravel, crushed gravel, crushed rock, crushed air-cooled iron blast furnace slag or combinations thereof. Crushed air-cooled blast furnace slag shall not be used in reinforced or prestressed concrete.
- Coarse aggregate shall conform to the following quality requirements:

| Tests | California Test | Requirements |
|---|-----------------|--------------|
| Loss in Los Angeles Rattler (after 500 revolutions) | 211 | 45% max. |
| Cleanness Value | | |
| Operating Range | 227 | 75 min. |
| Contract Compliance | 227 | 71 min. |

• In lieu of the above Cleanness Value requirements, a Cleanness Value "Operating Range" limit of 71, minimum, and a Cleanness Value "Contract Compliance" limit of 68, minimum, will be used to determine the acceptability of the coarse aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

1. coarse aggregate sampled at the completion of processing at the aggregate production plant had a Cleanness Value of not less than 82 when tested by California Test 227; and
2. prequalification tests performed in conformance with the requirements in California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

90-2.02B Fine Aggregate

- Fine aggregate shall consist of natural sand, manufactured sand produced from larger aggregate or a combination thereof. Manufactured sand shall be well graded.
- Fine aggregate shall conform to the following quality requirements:

| Test | California Test | Requirements |
|--|-----------------|---------------------------|
| Organic Impurities | 213 | Satisfactory ^a |
| Mortar Strengths Relative to Ottawa Sand | 515 | 95%, min. |
| Sand Equivalent: | | |
| Operating Range | 217 | 75, min. |
| Contract Compliance | 217 | 71, min. |

a Fine aggregate developing a color darker than the reference standard color solution may be accepted if it is determined by the Engineer, from mortar strength tests, that a darker color is acceptable.

• In lieu of the above Sand Equivalent requirements, a Sand Equivalent "Operating Range" limit of 71 minimum and a Sand Equivalent "Contract Compliance" limit of 68 minimum will be used to determine the acceptability of the fine aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

1. fine aggregate sampled at the completion of processing at the aggregate production plant had a Sand Equivalent value of not less than 82 when tested by California Test 217; and
2. prequalification tests performed in conformance with California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

90-2.03 WATER

• In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1300 parts per million of sulfates as SO₄, when tested in conformance with California Test 417. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, when tested in conformance with California Test 422,

nor more than 1300 parts per million of sulfates as SO₄, when tested in conformance with California Test 417. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with the requirements in ASTM Designation: C 191 or ASTM Designation: C 266 or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in conformance with the requirements in ASTM Designation: C 109, when compared to the results obtained with distilled water or deionized water, tested in conformance with the requirements in ASTM Designation: C 109.

- In non-reinforced concrete work, the water for curing, for washing aggregates and for mixing shall be free from oil and shall not contain more than 2000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, or more than 1500 parts per million of sulfates as SO₄, when tested in conformance with California Test 417.
- In addition to the above provisions, water for curing concrete shall not contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.
- Water reclaimed from mixer wash-out operations may be used in mixing concrete. The water shall not contain coloring agents or more than 300 parts per million of alkalis (Na₂O + 0.658 K₂O) as determined on the filtrate. The specific gravity of the water shall not exceed 1.03 and shall not vary more than ±0.010 during a day's operations.

90-2.04 ADMIXTURE MATERIALS

- Admixture materials shall conform to the requirements in the following ASTM Designations:
 - A. Chemical Admixtures—ASTM Designation: C 494.
 - B. Air-entraining Admixtures—ASTM Designation: C 260.
 - C. Calcium Chloride—ASTM Designation: D 98.
 - D. Mineral Admixtures—Coal fly ash; raw or calcined natural pozzolan as specified in ASTM Designation: C618; silica fume conforming to the requirements in ASTM Designation: C1240, with reduction of mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.
- Unless otherwise specified in the special provisions, mineral admixtures shall be used in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

90-3 AGGREGATE GRADINGS

90-3.01 GENERAL

- Before beginning concrete work, the Contractor shall submit in writing to the Engineer the gradation of the primary aggregate nominal sizes that the Contractor proposes to furnish. If a primary coarse aggregate or the fine aggregate is separated into 2 or more sizes, the proposed gradation shall consist of the gradation for each individual size, and the proposed proportions of each individual size, combined mathematically to indicate one proposed gradation. The proposed gradation shall meet the grading requirements shown in the table in this section, and shall show the percentage passing each of the sieve sizes used in determining the end result.
- The Engineer may waive, in writing, the gradation requirements in this Section 90-3.01 and in Sections 90-3.02, "Coarse Aggregate Grading," 90-3.03, "Fine Aggregate Grading," and 90-3.04, "Combined Aggregate Gradings," if, in the Engineer's opinion, furnishing the gradation is not necessary for the type or amount of concrete work to be constructed.
- Gradations proposed by the Contractor shall be within the following percentage passing limits:

| Primary Aggregate Nominal Size | Sieve Size | Limits of Proposed Gradation |
|--------------------------------|------------|------------------------------|
| 37.5-mm x 19-mm | 25-mm | 19 - 41 |
| 25-mm x 4.75-mm | 19-mm | 52 - 85 |
| 25-mm x 4.75-mm | 9.5-mm | 15 - 38 |
| 12.5-mm x 4.75-mm | 9.5-mm | 40 - 78 |
| 9.5-mm x 2.36-mm | 9.5-mm | 50 - 85 |
| Fine Aggregate | 1.18-mm | 55 - 75 |
| Fine Aggregate | 600-μm | 34 - 46 |
| Fine Aggregate | 300-μm | 16 - 29 |

- Should the Contractor change the source of supply, the Contractor shall submit in writing to the Engineer the new gradations before their intended use.

90-3.02 COARSE AGGREGATE GRADING

- The grading requirements for coarse aggregates are shown in the following table for each size of coarse aggregate:

| Sieve Sizes | Percentage Passing Primary Aggregate Nominal Sizes | | | | | | | |
|-------------|--|---------------------|-----------------|---------------------|-------------------|---------------------|------------------|---------------------|
| | 37.5-mm x 19-mm | | 25-mm x 4.75-mm | | 12.5-mm x 4.75-mm | | 9.5-mm x 2.36-mm | |
| | Operating Range | Contract Compliance | Operating Range | Contract Compliance | Operating Range | Contract Compliance | Operating Range | Contract Compliance |
| 50-mm | 100 | 100 | — | — | — | — | — | — |
| 37.5-mm | 88-100 | 85-100 | 100 | 100 | — | — | — | — |
| 25-mm | x ± 18 | X ± 25 | 88-100 | 86-100 | — | — | — | — |
| 19-mm | 0-17 | 0-20 | X ± 15 | X ± 22 | 100 | 100 | — | — |
| 12.5-mm | — | — | — | — | 82-100 | 80-100 | 100 | 100 |
| 9.5-mm | 0-7 | 0-9 | X ± 15 | X ± 22 | X ± 15 | X ± 22 | X ± 15 | X ± 20 |
| 4.75-mm | — | — | 0-16 | 0-18 | 0-15 | 0-18 | 0-25 | 0-28 |
| 2.36-mm | — | — | 0-6 | 0-7 | 0-6 | 0-7 | 0-6 | 0-7 |

- In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."
- Coarse aggregate for the 37.5-mm, maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," shall be furnished in 2 or more primary aggregate nominal sizes. Each primary aggregate nominal size may be separated into 2 sizes and stored separately, provided that the combined material conforms to the grading requirements for that particular primary aggregate nominal size.
- When the 25-mm, maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," is to be used, the coarse aggregate may be separated into 2 sizes and stored separately, provided that the combined material shall conform to the grading requirements for the 25-mm x 4.75-mm primary aggregate nominal size.

90-3.03 FINE AGGREGATE GRADING

- Fine aggregate shall be graded within the following limits:

| Sieve Sizes | Percentage Passing | |
|-------------|--------------------|---------------------|
| | Operating Range | Contract Compliance |
| 9.5-mm | 100 | 100 |
| 4.75-mm | 95-100 | 93-100 |
| 2.36-mm | 65-95 | 61-99 |
| 1.18-mm | X ± 10 | X ± 13 |
| 600-µm | X ± 9 | X ± 12 |
| 300-µm | X ± 6 | X ± 9 |
| 150-µm | 2-12 | 1-15 |
| 75-µm | 0-8 | 0-10 |

- In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."
- In addition to the above required grading analysis, the distribution of the fine aggregate sizes shall be such that the difference between the total percentage passing the 1.18-mm sieve and the total percentage passing the 600-µm sieve shall be between 10 and 40, and the difference between the percentage passing the 600-µm and 300-µm sieves shall be between 10 and 40.
- Fine aggregate may be separated into 2 or more sizes and stored separately, provided that the combined material conforms to the grading requirements specified in this Section 90-3.03.

90-3.04 COMBINED AGGREGATE GRADINGS

- Combined aggregate grading limits shall be used only for the design of concrete mixes. Concrete mixes shall be designed so that aggregates are combined in proportions that shall produce a mixture within the grading limits for combined aggregates as specified herein. Within these limitations, the relative proportions shall be as ordered by the Engineer, except as otherwise provided in Section 90-1.01, "Description."
- The combined aggregate grading used in portland cement concrete pavement shall be the 37.5-mm, maximum grading.

- The combined aggregate grading used in concrete for structures and other concrete items, except when specified otherwise in these specifications or the special provisions, shall be either the 37.5-mm, maximum grading, or the 25-mm, maximum grading, at the option of the Contractor.

Grading Limits of Combined Aggregates

| Sieve Sizes | Percentage Passing | | | |
|-------------|--------------------|------------|--------------|-------------|
| | 37.5-mm Max. | 25-mm Max. | 12.5-mm Max. | 9.5-mm Max. |
| 50-mm | 100 | — | — | — |
| 37.5-mm | 90-100 | 100 | — | — |
| 25-mm | 50-86 | 90-100 | — | — |
| 19-mm | 45-75 | 55-100 | 100 | — |
| 12.5-mm | — | — | 90-100 | 100 |
| 9.5-mm | 38-55 | 45-75 | 55-86 | 50 - 100 |
| 4.75-mm | 30-45 | 35-60 | 45-63 | 45 - 63 |
| 2.36-mm | 23-38 | 27-45 | 35-49 | 35 - 49 |
| 1.18-mm | 17-33 | 20-35 | 25-37 | 25 - 37 |
| 600-μm | 10-22 | 12-25 | 15-25 | 15 - 25 |
| 300-μm | 4-10 | 5-15 | 5-15 | 5 - 15 |
| 150-μm | 1-6 | 1-8 | 1-8 | 1 - 8 |
| 75-μm | 0-3 | 0-4 | 0-4 | 0 - 4 |

- Changes from one grading to another shall not be made during the progress of the work unless permitted by the Engineer.

90-4 ADMIXTURES

90-4.01 GENERAL

- Admixtures used in portland cement concrete shall conform to and be used in conformance with the provisions in this Section 90-4 and the special provisions. Admixtures shall be used when specified or ordered by the Engineer and may be used at the Contractor's option as provided herein.
- Chemical admixtures and air-entraining admixtures containing chlorides as Cl in excess of one percent by mass of admixture, as determined by California Test 415, shall not be used in prestressed or reinforced concrete.
- Calcium chloride shall not be used in concrete containing steel reinforcement or other embedded metals.
- Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be from the same source and of the same percentage.
- Admixtures shall be uniform in properties throughout their use in the work. Should it be found that an admixture as furnished is not uniform in properties, its use shall be discontinued.
- If more than one admixture is used, the admixtures shall be compatible with each other so that the desirable effects of all admixtures used will be realized.

90-4.02 MATERIALS

- Admixture materials shall conform to the provisions in Section 90-2.04, "Admixture Materials."

90-4.03 ADMIXTURE APPROVAL

- No admixture brand shall be used in the work unless it is on the Department's current list of approved brands for the type of admixture involved.
- Admixture brands will be considered for addition to the approved list if the manufacturer of the admixture submits to the Transportation Laboratory a sample of the admixture accompanied by certified test results demonstrating that the admixture complies with the requirements in the appropriate ASTM Designation and these specifications. The sample shall be sufficient to permit performance of all required tests. Approval of admixture brands will be dependent upon a determination as to compliance with the requirements, based on the certified test results submitted, together with tests the Department may elect to perform.
- When the Contractor proposes to use an admixture of a brand and type on the current list of approved admixture brands, the Contractor shall furnish a Certificate of Compliance from the manufacturer, as provided in Section 6-1.07, "Certificates of Compliance," certifying that the admixture furnished is the same as that previously approved. If a previously approved admixture is not accompanied by a Certificate of Compliance, the admixture shall not be used in the work until the

Engineer has had sufficient time to make the appropriate tests and has approved the admixture for use. The Engineer may take samples for testing at any time, whether or not the admixture has been accompanied by a Certificate of Compliance.

- If a mineral admixture is delivered directly to the site of the work, the Certificate of Compliance shall be signed by the manufacturer or supplier of the mineral admixture. If the mineral admixture is used in ready-mix concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product.

90-4.04 REQUIRED USE OF CHEMICAL ADMIXTURES AND CALCIUM CHLORIDE

- When the use of a chemical admixture or calcium chloride is specified or ordered by the Engineer, the admixture shall be used at the dosage specified or ordered, except that if no dosage is specified or ordered, the admixture shall be used at the dosage normally recommended by the manufacturer of the admixture.

- Calcium chloride shall be dispensed in liquid, flake, or pellet form. Calcium chloride dispensed in liquid form shall conform to the provisions for dispensing liquid admixtures in Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures."

90-4.05 OPTIONAL USE OF CHEMICAL ADMIXTURES

- The Contractor will be permitted to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM Designation: C 494 to conserve cementitious material or to facilitate any concrete construction application subject to the following conditions:

- A. When a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by mass, except that the resultant cementitious material content shall be not less than 300 kilograms per cubic meter; and
- B. When a reduction in cementitious material content is made, the dosage of admixture used shall be the dosage used in determining approval of the admixture.

- Unless otherwise specified, a Type C accelerating chemical admixture conforming to the requirements in ASTM Designation: C 494, may be used in portland cement concrete. Inclusion in the mix design submitted for approval will not be required provided that the admixture is added to counteract changing conditions that contribute to delayed setting of the portland cement concrete, and the use or change in dosage of the admixture is approved in writing by the Engineer.

90-4.06 REQUIRED USE OF AIR-ENTRAINING ADMIXTURES

- When air-entrainment is specified or ordered by the Engineer, the air-entraining admixture shall be used in amounts to produce a concrete having the specified air content as determined by California Test 504.

90-4.07 OPTIONAL USE OF AIR-ENTRAINING ADMIXTURES

- When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent, and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate as provided in Section 40-1.015, "Cement Content."

90-4.08 REQUIRED USE OF MINERAL ADMIXTURES

- Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material.
- The calcium oxide content of mineral admixtures shall not exceed 10 percent and the available alkali, as sodium oxide equivalent, shall not exceed 1.5 percent when determined in conformance with the requirements in ASTM Designation: C 618.

- The amounts of cement and mineral admixture used in cementitious material shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:

- A. The minimum amount of cement shall not be less than 75 percent by mass of the specified minimum cementitious material content;
- B. The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:

1. When the calcium oxide content of a mineral admixture is equal to or less than 2 percent by mass, the amount of mineral admixture shall not be less than 15 percent by mass of the total amount of cementitious material to be used in the mix;
 2. When the calcium oxide content of a mineral admixture is greater than 2 percent, the amount of mineral admixture shall not be less than 25 percent by mass of the total amount of cementitious material to be used in the mix;
 3. When a mineral admixture that conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," is used, the amount of mineral admixture shall not be less than 10 percent by mass of the total amount of cementitious material to be used in the mix
- C. The total amount of mineral admixture shall not exceed 35 percent by mass of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in kilograms per cubic meter, the total mass of cement and mineral admixture per cubic meter shall not exceed the specified maximum cementitious material content.

90-4.09 BLANK

90-4.10 PROPORTIONING AND DISPENSING LIQUID ADMIXTURES

- Chemical admixtures and air-entraining admixtures shall be dispensed in liquid form. Dispensers for liquid admixtures shall have sufficient capacity to measure at one time the prescribed quantity required for each batch of concrete. Each dispenser shall include a graduated measuring unit into which liquid admixtures are measured to within ± 5 percent of the prescribed quantity for each batch. Dispensers shall be located and maintained so that the graduations can be accurately read from the point at which proportioning operations are controlled to permit a visual check of batching accuracy prior to discharge. Each measuring unit shall be clearly marked for the type and quantity of admixture.
- Each liquid admixture dispensing system shall be equipped with a sampling device consisting of a valve located in a safe and readily accessible position such that a sample of the admixture may be withdrawn slowly by the Engineer.
- If more than one liquid admixture is used in the concrete mix, each liquid admixture shall have a separate measuring unit and shall be dispensed by injecting equipment located in such a manner that the admixtures are not mixed at high concentrations and do not interfere with the effectiveness of each other. When air-entraining admixtures are used in conjunction with other liquid admixtures, the air-entraining admixture shall be the first to be incorporated into the mix.
- When automatic proportioning devices are required for concrete pavement, dispensers for liquid admixtures shall operate automatically with the batching control equipment. The dispensers shall be equipped with an automatic warning system in good operating condition that will provide a visible or audible signal at the point at which proportioning operations are controlled when the quantity of admixture measured for each batch of concrete varies from the preselected dosage by more than 5 percent, or when the entire contents of the measuring unit are not emptied from the dispenser into each batch of concrete.
- Unless liquid admixtures are added to premeasured water for the batch, their discharge into the batch shall be arranged to flow into the stream of water so that the admixtures are well dispersed throughout the batch, except that air-entraining admixtures may be dispensed directly into moist sand in the batching bins provided that adequate control of the air content of the concrete can be maintained.
- Liquid admixtures requiring dosages greater than 2.5 L/m^3 shall be considered to be water when determining the total amount of free water as specified in Section 90-6.06, "Amount of Water and Penetration."
- Special admixtures, such as "high range" water reducers that may contribute to a high rate of slump loss, shall be measured and dispensed as recommended by the admixture manufacturer and as approved by the Engineer.

90-4.11 STORAGE, PROPORTIONING, AND DISPENSING OF MINERAL ADMIXTURES

- Mineral admixtures shall be protected from exposure to moisture until used. Sacked material shall be piled to permit access for tally, inspection and identification for each shipment.
- Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for sampling mineral admixtures shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper.
- Mineral admixtures shall be incorporated into concrete using equipment conforming to the requirements for cement weigh hoppers, and charging and discharging mechanisms in ASTM Designation: C 94, in Section 90-5.03, "Proportioning," and in this Section 90-4.11.
- When concrete is completely mixed in stationary paving mixers, the mineral admixture shall be weighed in a separate weigh hopper conforming to the provisions for cement weigh hoppers and charging and discharging mechanisms in

Section 90-5.03A, "Proportioning for Pavement," and the mineral admixture and cement shall be introduced simultaneously into the mixer proportionately with the aggregate. If the mineral admixture is not weighed in a separate weigh hopper, the Contractor shall provide certification that the stationary mixer is capable of mixing the cement, admixture, aggregates and water uniformly prior to discharge. Certification shall contain the following:

- A. Test results for 2 compressive strength test cylinders of concrete taken within the first one-third and 2 compressive strength test cylinders of concrete taken within the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;"
- B. Calculations demonstrating that the difference in the averages of 2 compressive strengths taken in the first one-third is no greater than 7.5 percent different than the averages of 2 compressive strengths taken in the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;" and
- C. The mixer rotation speed and time of mixing prior to discharge that are required to produce a mix that meets the requirements above.

90-5 PROPORTIONING

90-5.01 STORAGE OF AGGREGATES

- Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size shall be avoided and also that the various sizes shall not become intermixed before proportioning.
- Aggregates shall be stored or stockpiled and handled in a manner that shall prevent contamination by foreign materials. In addition, storage of aggregates at batching or mixing facilities that are erected subsequent to the award of the contract and that furnish concrete to the project shall conform to the following:
 - A. Intermingling of the different sizes of aggregates shall be positively prevented. The Contractor shall take the necessary measures to prevent intermingling. The preventive measures may include, but are not necessarily limited to, physical separation of stockpiles or construction of bulkheads of adequate length and height; and
 - B. Contamination of aggregates by contact with the ground shall be positively prevented. The Contractor shall take the necessary measures to prevent contamination. The preventive measures shall include, but are not necessarily limited to, placing aggregates on wooden platforms or on hardened surfaces consisting of portland cement concrete, asphalt concrete, or cement treated material.
- In placing aggregates in storage or in moving the aggregates from storage to the weigh hopper of the batching plant, any method that may cause segregation, degradation, or the combining of materials of different gradings that will result in any size of aggregate at the weigh hopper failing to meet the grading requirements, shall be discontinued. Any method of handling aggregates that results in excessive breakage of particles shall be discontinued. The use of suitable devices to reduce impact of falling aggregates may be required by the Engineer.

90-5.02 PROPORTIONING DEVICES

- Weighing, measuring, or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, automatic weighing systems shall comply with the requirements for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." Automatic devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and mineral admixture for one batch of concrete is a single operation of a switch or starter.
- Proportioning devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to ensure their accuracy.
- Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the mass of each batch of material shall not vary from the mass designated by the Engineer by more than the tolerances specified herein.
- Equipment for cumulative weighing of aggregate shall have a zero tolerance of ± 0.5 percent of the designated total batch mass of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be ± 0.5 percent of the individual batch mass designated for each size of aggregate. Equipment for cumulative weighing of cement and mineral admixtures shall have a zero tolerance of ± 0.5 percent of the designated total batch mass of the cement and mineral admixture. Equipment for weighing cement or mineral admixture separately shall have a zero tolerance of ± 0.5 percent of their designated individual batch masses. Equipment for measuring water shall have a zero tolerance of ± 0.5 percent of its designated mass or volume.

- The mass indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

- A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch mass of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch masses; and
- B. Cement shall be within 1.0 percent of its designated batch mass. When weighed individually, mineral admixture shall be within 1.0 percent of its designated batch mass. When mineral admixture and cement are permitted to be weighed cumulatively, cement shall be weighed first to within 1.0 percent of its designated batch mass, and the total for cement and mineral admixture shall be within 1.0 percent of the sum of their designated batch masses; and
- C. Water shall be within 1.5 percent of its designated mass or volume.

- Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, mineral admixture, or cement plus mineral admixture and aggregates shall not exceed that of commercially available scales having single graduations indicating a mass not exceeding the maximum permissible mass variation above, except that no scale shall be required having a capacity of less than 500 kg, with 0.5-kg graduations.

90-5.03 PROPORTIONING

- Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cement, mineral admixture, and water as provided in these specifications. Aggregates shall be proportioned by mass.

- At the time of batching, aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry mass.

- Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.

- Bulk "Type IP (MS) Modified" cement shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer.

- Bulk cement and mineral admixture may be weighed in separate, individual weigh hoppers or may be weighed in the same weigh hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. If the cement and mineral admixture are weighed cumulatively, the cement shall be weighed first.

- When cement and mineral admixtures are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the mineral admixture shall be individual and distinct from all other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and an indicator to constitute an individual and independent material weighing device. The cement and the mineral admixture shall be discharged into the mixer simultaneously with the aggregate.

- The scales and weigh hoppers for bulk weighing cement, mineral admixture, or cement plus mineral admixture shall be separate and distinct from the aggregate weighing equipment.

- For batches with a volume of one cubic meter or more, the batching equipment shall conform to one of the following combinations:

- A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
- B. Single box and scale indicator for all aggregates.
- C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

- In order to check the accuracy of batch masses, the gross mass and tare mass of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed at the Contractor's expense on scales designated by the Engineer.

90-5.03A Proportioning for Pavement

- Aggregates and bulk cement, mineral admixture, and cement plus mineral admixture for use in pavement shall be proportioned by mass by means of automatic proportioning devices of approved type conforming to these specifications.

- The Contractor shall install and maintain in operating condition an electronically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by mass of the fine aggregate.

- The batching of cement, mineral admixture, or cement plus mineral admixture and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and mineral admixture hoppers or the cement plus mineral admixture hopper are charged with masses that are within the tolerances specified in Section 90-5.02, "Proportioning Devices."
- When interlocks are required for cement and mineral admixture charging mechanisms and cement and mineral admixtures are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the mass of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."
- The discharge gate on the cement and mineral admixture hoppers or the cement plus mineral admixture hopper shall be designed to permit regulating the flow of cement, mineral admixture, or cement plus mineral admixture into the aggregate as directed by the Engineer.
- When separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.
- Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and so that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.
- When the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required mass is discharged into the weigh box, after which the gate shall automatically close and lock.
- The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

90-6 MIXING AND TRANSPORTING

90-6.01 GENERAL

- Concrete shall be mixed in mechanically operated mixers, except that when permitted by the Engineer, batches not exceeding 0.25 m³ may be mixed by hand methods in conformance with the provisions in Section 90-6.05, "Hand-Mixing."
- Equipment having components made of aluminum or magnesium alloys that would have contact with plastic concrete during mixing, transporting, or pumping of portland cement concrete shall not be used.
- Concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement, mineral admixture, or cement plus mineral admixture.
- Uniformity of concrete mixtures will be determined by differences in penetration as determined by California Test 533, or slump as determined by ASTM Designation: C 143, and by variations in the proportion of coarse aggregate as determined by California Test 529.
- When the mix design specifies a penetration value, the difference in penetration, determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed 10 mm. When the mix design specifies a slump value, the difference in slump, determined by comparing slump tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed the values given in the table below. Variation in the proportion of coarse aggregate will be determined by comparing the results of tests of 2 samples of mixed concrete from the same batch or truck mixer load and the difference between the 2 results shall not exceed 100 kg per cubic meter of concrete.

| Average Slump | Maximum Permissible Difference |
|-------------------------------|--------------------------------|
| Less than 100-mm | 25-mm |
| 100-mm to 150-mm | 38-mm |
| Greater than 150-mm to 225-mm | 50-mm |

- The Contractor, at the Contractor's expense, shall furnish samples of the freshly mixed concrete and provide satisfactory facilities for obtaining the samples.

90-6.02 MACHINE MIXING

- Concrete mixers may be of the revolving drum or the revolving blade type, and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. Mixers and agitators that have an accumulation of hard concrete or mortar shall not be used.
- The temperature of mixed concrete, immediately before placing, shall be not less than 10°C or more than 32°C. Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits. Neither

aggregates nor mixing water shall be heated to exceed 65°C. If ice is used to cool the concrete, discharge of the mixer will not be permitted until all ice is melted.

- The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one - fourth of the specified mixing time.

- Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions that reduce or vary the required quantity of cementitious material in the concrete mixture.

- Paving and stationary mixers shall be operated with an automatic timing device. The timing device and discharge mechanism shall be interlocked so that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.

- The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

- The size of batch shall not exceed the manufacturer's guaranteed capacity.

- When producing concrete for pavement or base, suitable batch counters shall be installed and maintained in good operating condition at jobsite batching plants and stationary mixers. The batch counters shall indicate the exact number of batches proportioned and mixed.

- Concrete shall be mixed and delivered to the jobsite by means of one of the following combinations of operations:

- A. Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in truck agitators or in non-agitating hauling equipment (central-mixed concrete).

- B. Mixed partially in a stationary mixer, and the mixing completed in a truck mixer (shrink-mixed concrete).

- C. Mixed completely in a truck mixer (transit-mixed concrete).

- D. Mixed completely in a paving mixer.

- Agitators may be truck mixers operating at agitating speed or truck agitators. Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates on which is plainly marked the various uses for which the equipment is designed, the manufacturer's guaranteed capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum or blades.

- Truck mixers shall be equipped with electrically or mechanically actuated revolution counters by which the number of revolutions of the drum or blades may readily be verified.

- When shrink-mixed concrete is furnished, concrete that has been partially mixed at a central plant shall be transferred to a truck mixer and all requirements for transit-mixed concrete shall apply. No credit in the number of revolutions at mixing speed shall be allowed for partial mixing in a central plant.

90-6.03 TRANSPORTING MIXED CONCRETE

- Mixed concrete may be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturer of the equipment as agitating speed, or in non-agitating hauling equipment, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable for adequate placement and consolidation in place, and provided the mixed concrete after hauling to the delivery point conforms to the provisions in Section 90-6.01, "General."

- Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity and shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.

- Bodies of non-agitating hauling equipment shall be constructed so that leakage of the concrete mix, or any part thereof, will not occur at any time.

- Concrete hauled in open-top vehicles shall be protected during hauling against rain or against exposure to the sun for more than 20 minutes when the ambient temperature exceeds 24°C.

- No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer. If the Engineer authorizes additional water to be incorporated into the concrete, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharge is commenced.

- The rate of discharge of mixed concrete from truck mixer-agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

- When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours or before 250 revolutions of the drum or blades, whichever occurs first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30°C or above, the time allowed may be less than 1.5 hours.

- When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30°C or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.
- Each load of concrete delivered at the jobsite shall be accompanied by a weighmaster certificate showing the mix identification number, non-repeating load number, date and time at which the materials were batched, the total amount of water added to the load, and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This weighmaster certificate shall also show the actual scale masses (kilograms) for the ingredients batched. Theoretical or target batch masses shall not be used as a substitute for actual scale masses.
- Weighmaster certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on a 90 mm diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be "line feed, carriage return" (LFCR) and "one line, separate record" with allowances for sufficient fields to satisfy the amount of data required by these specifications.
- The Contractor may furnish a weighmaster certificate accompanied by a separate certificate that lists the actual batch masses or measurements for a load of concrete provided that both certificates are imprinted with the same non-repeating load number that is unique to the contract and delivered to the jobsite with the load.
- Weighmaster certificates furnished by the Contractor shall conform to the provisions in Section 9-1.01, "Measurement of Quantities."

90-6.04 TIME OR AMOUNT OF MIXING

- Mixing of concrete in paving or stationary mixers shall continue for the required mixing time after all ingredients, except water and admixture, if added with the water, are in the mixing compartment of the mixer before any part of the batch is released. Transfer time in multiple drum mixers shall not be counted as part of the required mixing time.
- The required mixing time, in paving or stationary mixers, of concrete used for concrete structures, except minor structures, shall be not less than 90 seconds or more than 5 minutes, except that when directed by the Engineer in writing, the requirements of the following paragraph shall apply.
- The required mixing time, in paving or stationary mixers, except as provided in the preceding paragraph, shall be not less than 50 seconds or more than 5 minutes.
- The minimum required revolutions at the mixing speed for transit-mixed concrete shall not be less than that recommended by the mixer manufacturer, but in no case shall the number of revolutions be less than that required to consistently produce concrete conforming to the provisions for uniformity in Section 90-6.01, "General."

90-6.05 HAND-MIXING

- Hand-mixed concrete shall be made in batches of not more than 0.25 m³ and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than 0.3 meters in total depth. On this mixture shall be spread the dry cement and mineral admixture and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

90-6.06 AMOUNT OF WATER AND PENETRATION

- The amount of water used in concrete mixes shall be regulated so that the penetration of the concrete as determined by California Test 533 or the slump of the concrete as determined by ASTM Designation: C 143 is within the "Nominal" values shown in the following table. When the penetration or slump of the concrete is found to exceed the nominal values listed, the mixture of subsequent batches shall be adjusted to reduce the penetration or slump to a value within the nominal range shown. Batches of concrete with a penetration or slump exceeding the maximum values listed shall not be used in the work. When Type F or Type G chemical admixtures are added to the mix, the penetration requirements shall not apply and the slump shall not exceed 225 mm after the chemical admixtures are added.

| Type of Work | Nominal | | Maximum | |
|------------------------------------|------------------|------------|------------------|------------|
| | Penetration (mm) | Slump (mm) | Penetration (mm) | Slump (mm) |
| Concrete Pavement | 0-25 | — | 40 | — |
| Non-reinforced concrete facilities | 0-35 | — | 50 | — |
| Reinforced concrete structures | | | | |
| Sections over 300-mm thick | 0-35 | — | 65 | — |
| Sections 300-mm thick or less | 0-50 | — | 75 | — |
| Concrete placed under water | — | 150-200 | — | 225 |
| Cast-in-place concrete piles | 65-90 | 130-180 | 100 | 200 |

- The amount of free water used in concrete shall not exceed 183 kg/m^3 , plus 20 kg for each required 100 kg of cementitious material in excess of 325 kg/m^3 .• The term free water is defined as the total water in the mixture minus the water absorbed by the aggregates in reaching a saturated surface-dry condition.

- Where there are adverse or difficult conditions that affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic meter of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 kg of water per added 100 kg of cementitious material per cubic meter. The cost of additional cementitious material and water added under these conditions shall be at the Contractor's expense and no additional compensation will be allowed therefor.

- The equipment for supplying water to the mixer shall be constructed and arranged so that the amount of water added can be measured accurately. Any method of discharging water into the mixer for a batch shall be accurate within 1.5 percent of the quantity of water required to be added to the mix for any position of the mixer. Tanks used to measure water shall be designed so that water cannot enter while water is being discharged into the mixer and discharge into the mixer shall be made rapidly in one operation without dribbling. All equipment shall be arranged so as to permit checking the amount of water delivered by discharging into measured containers.

90-7 CURING CONCRETE

90-7.01 METHODS OF CURING

- Newly placed concrete shall be cured by the methods specified in this Section 90-7.01 and the special provisions.

90-7.01A Water Method

- The concrete shall be kept continuously wet by the application of water for a minimum curing period of 7 days after the concrete has been placed.

- When a curing medium consisting of cotton mats, rugs, carpets, or earth or sand blankets is to be used to retain the moisture, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface. At the expiration of the curing period, the concrete surfaces shall be cleared of all curing mediums.

- When concrete bridge decks and flat slabs are to be cured without the use of a curing medium, the entire surface of the bridge deck or slab shall be kept damp by the application of water with an atomizing nozzle as specified in the preceding paragraph, until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for a period of not less than 7 days.

90-7.01B Curing Compound Method

- Surfaces of the concrete that are exposed to the air shall be sprayed uniformly with a curing compound.
- Curing compounds to be used shall be as follows:

- Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B, except the resin type shall be poly-alpha-methylstyrene.
- Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B.
- Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class A.
- Non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class B.
- Non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class A.

6. Non-pigmented curing compound with fugitive dye conforming to the requirements in ASTM Designation: C 309, Type 1-D, Class A.

- The infrared scan for the dried vehicle from curing compound (1) shall match the infrared scan on file at the Transportation Laboratory.
- The loss of water for each type of curing compound, when tested in conformance with the requirements in California Test 534, shall not be more than 0.15-kg/m² in 24 hours or more than 0.45-kg/m² in 72 hours.
- The curing compound to be used will be specified elsewhere in these specifications or in the special provisions.
- When the use of curing compound is required or permitted elsewhere in these specifications or in the special provisions and no specific kind is specified, any of the curing compounds listed above may be used.
- Curing compound shall be applied at a nominal rate of 3.7 m²/L, unless otherwise specified.
- At any point, the application rate shall be within ± 1.2 m²/L of the nominal rate specified, and the average application rate shall be within ± 0.5 m²/L of the nominal rate specified when tested in conformance with the requirements in California Test 535. Runs, sags, thin areas, skips, or holidays in the applied curing compound shall be evidence that the application is not satisfactory.
- Curing compounds shall be applied using power operated spray equipment. The power operated spraying equipment shall be equipped with an operational pressure gage and a means of controlling the pressure. Hand spraying of small and irregular areas that are not reasonably accessible to mechanical spraying equipment, in the opinion of the Engineer, may be permitted.
- The curing compound shall be applied to the concrete following the surface finishing operation, immediately before the moisture sheen disappears from the surface, but before any drying shrinkage or craze cracks begin to appear. In the event of any drying or cracking of the surface, application of water with an atomizing nozzle as specified in Section 90-7.01A, "Water Method," shall be started immediately and shall be continued until application of the compound is resumed or started; however, the compound shall not be applied over any resulting freestanding water. Should the film of compound be damaged from any cause before the expiration of 7 days after the concrete is placed in the case of structures and 72 hours in the case of pavement, the damaged portion shall be repaired immediately with additional compound.
- At the time of use, compounds containing pigments shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. A paddle shall be used to loosen all settled pigment from the bottom of the container, and a power driven agitator shall be used to disperse the pigment uniformly throughout the vehicle.
- Agitation shall not introduce air or other foreign substance into the curing compound.
- The manufacturer shall include in the curing compound the necessary additives for control of sagging, pigment settling, leveling, de-emulsification, or other requisite qualities of a satisfactory working material. Pigmented curing compounds shall be manufactured so that the pigment does not settle badly, does not cake or thicken in the container, and does not become granular or curdled. Settlement of pigment shall be a thoroughly wetted, soft, mushy mass permitting the complete and easy vertical penetration of a paddle. Settled pigment shall be easily redispersed, with minimum resistance to the sideways manual motion of the paddle across the bottom of the container, to form a smooth uniform product of the proper consistency.
- Curing compounds shall remain sprayable at temperatures above 4°C and shall not be diluted or altered after manufacture.
- The curing compound shall be packaged in clean 210-L barrels or round 19-L containers or shall be supplied from a suitable storage tank located at the jobsite. The containers shall comply with "Title 49, Code of Federal Regulations, Hazardous Materials Regulations." The 210-L barrels shall have removable lids and airtight fasteners. The 19-L containers shall be round and have standard full open head and bail. Lids with bungholes shall not be permitted. On-site storage tanks shall be kept clean and free of contaminants. Each tank shall have a permanent system designed to completely redisperse settled material without introducing air or other foreign substances.
- Steel containers and lids shall be lined with a coating that will prevent destructive action by the compound or chemical agents in the air space above the compound. The coating shall not come off the container or lid as skins. Containers shall be filled in a manner that will prevent skinning. Plastic containers shall not react with the compound.
- Each container shall be labeled with the manufacturer's name, kind of curing compound, batch number, volume, date of manufacture, and volatile organic compound (VOC) content. The label shall also warn that the curing compound containing pigment shall be well stirred before use. Precautions concerning the handling and the application of curing compound shall be shown on the label of the curing compound containers in conformance with the Construction Safety Orders and General Industry Safety Orders of the State of California.
- Containers of curing compound shall be labeled to indicate that the contents fully comply with the rules and regulations concerning air pollution control in the State of California.
- When the curing compound is shipped in tanks or tank trucks, a shipping invoice shall accompany each load. The invoice shall contain the same information as that required herein for container labels.

- Curing compound will be sampled by the Engineer at the source of supply or at the jobsite or at both locations.
- Curing compound shall be formulated so as to maintain the specified properties for a minimum of one year. The Engineer may require additional testing before use to determine compliance with these specifications if the compound has not been used within one year or whenever the Engineer has reason to believe the compound is no longer satisfactory.
- Tests will be conducted in conformance with the latest ASTM test methods and methods in use by the Transportation Laboratory.

90-7.01C Waterproof Membrane Method

- The exposed finished surfaces of concrete shall be sprayed with water, using a nozzle that so atomizes the flow that a mist and not a spray is formed, until the concrete has set, after which the curing membrane shall be placed. The curing membrane shall remain in place for a period of not less than 72 hours.
- Sheeting material for curing concrete shall conform to the requirements in AASHTO Designation: M 171 for white reflective materials.
- The sheeting material shall be fabricated into sheets of such width as to provide a complete cover for the entire concrete surface. Joints in the sheets shall be securely cemented together in such a manner as to provide a waterproof joint. The joint seams shall have a minimum lap of 100 mm.
- The sheets shall be securely weighted down by placing a bank of earth on the edges of the sheets or by other means satisfactory to the Engineer.
- Should any portion of the sheets be broken or damaged before the expiration of 72 hours after being placed, the broken or damaged portions shall be immediately repaired with new sheets properly cemented into place.
- Sections of membrane that have lost their waterproof qualities or have been damaged to such an extent as to render them unfit for curing the concrete shall not be used.

90-7.01D Forms-In-Place Method

- Formed surfaces of concrete may be cured by retaining the forms in place. The forms shall remain in place for a minimum period of 7 days after the concrete has been placed, except that for members over 0.5-m in least dimension the forms shall remain in place for a minimum period of 5 days.
- Joints in the forms and the joints between the end of forms and concrete shall be kept moisture tight during the curing period. Cracks in the forms and cracks between the forms and the concrete shall be resealed by methods subject to the approval of the Engineer.

90-7.02 CURING PAVEMENT

- The entire exposed area of the pavement, including edges, shall be cured by the waterproof membrane method, or curing compound method using curing compound (1) or (2) as the Contractor may elect. Should the side forms be removed before the expiration of 72 hours following the start of curing, the exposed pavement edges shall also be cured. If the pavement is cured by means of the curing compound method, the sawcut and all portions of the curing compound that have been disturbed by sawing operations shall be restored by spraying with additional curing compound.
- Curing shall commence as soon as the finishing process provided in Section 40-1.10, "Final Finishing," has been completed. The method selected shall conform to the provisions in Section 90-7.01, "Methods of Curing."
- When the curing compound method is used, the compound shall be applied to the entire pavement surface by mechanical sprayers. Spraying equipment shall be of the fully atomizing type equipped with a tank agitator that provides for continual agitation of the curing compound during the time of application. The spray shall be adequately protected against wind, and the nozzles shall be so oriented or moved mechanically transversely as to result in the minimum specified rate of coverage being applied uniformly on exposed faces. Hand spraying of small and irregular areas, and areas inaccessible to mechanical spraying equipment, in the opinion of the Engineer, will be permitted. When the ambient air temperature is above 15°C, the Contractor shall fog the surface of the concrete with a fine spray of water as specified in Section 90-7.01A, "Water Method." The surface of the pavement shall be kept moist between the hours of 10:00 a.m. and 4:30 p.m. on the day the concrete is placed. However, the fogging done after the curing compound has been applied shall not begin until the compound has set sufficiently to prevent displacement. Fogging shall be discontinued if ordered in writing by the Engineer.

90-7.03 CURING STRUCTURES

- Newly placed concrete for cast-in-place structures, other than highway bridge decks, shall be cured by the water method, the forms-in-place method, or, as permitted herein, by the curing compound method, in conformance with the provisions in Section 90-7.01, "Methods of Curing."
- The curing compound method using a pigmented curing compound may be used on concrete surfaces of construction joints, surfaces that are to be buried underground, and surfaces where only Ordinary Surface Finish is to be

applied and on which a uniform color is not required and that will not be visible from a public traveled way. If the Contractor elects to use the curing compound method on the bottom slab of box girder spans, the curing compound shall be curing compound (1).

- The top surface of highway bridge decks shall be cured by both the curing compound method and the water method. The curing compound shall be curing compound (1). The curing compound shall be applied progressively during the deck finishing operations immediately after finishing operations are completed on each individual portion of the deck. The water cure shall be applied not later than 4 hours after completion of deck finishing or, for portions of the decks on which finishing is completed after normal working hours, the water cure shall be applied not later than the following morning.

- Concrete surfaces of minor structures, as defined in Section 51-1.02, "Minor Structures," shall be cured by the water method, the forms-in-place method or the curing compound method.

- When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surfaces being cured by the curing compound method or by the forms-in-place method, until the Engineer determines that a cooling effect is no longer required. Application of water for this purpose will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

90-7.04 CURING PRECAST CONCRETE MEMBERS

- Precast concrete members shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing." Curing shall be provided for the minimum time specified for each method or until the concrete reaches its design strength, whichever is less. Steam curing may also be used for precast members and shall conform to the following provisions:

- A. After placement of the concrete, members shall be held for a minimum 4-hour presteaming period. If the ambient air temperature is below 10°C, steam shall be applied during the presteaming period to hold the air surrounding the member at a temperature between 10°C and 32°C.
- B. To prevent moisture loss on exposed surfaces during the presteaming period, members shall be covered as soon as possible after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.
- C. Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner as to prevent the loss of steam and moisture.
- D. Steam at the jets shall be at low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure shall not exceed 22°C per hour. The curing temperature throughout the enclosure shall not exceed 65°C and shall be maintained at a constant level for a sufficient time necessary to develop the required transfer strength. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.
- E. Temperature recording devices that will provide an accurate, continuous, permanent record of the curing temperature shall be provided. A minimum of one temperature recording device per 60 m of continuous bed length will be required for checking temperature.
- F. Members in pretension beds shall be detensioned immediately after the termination of steam curing while the concrete and forms are still warm, or the temperature under the enclosure shall be maintained above 15°C until the stress is transferred to the concrete.
- G. Curing of precast concrete will be considered completed after termination of the steam curing cycle.

90-7.05 CURING PRECAST PRESTRESSED CONCRETE PILES

- Newly placed concrete for precast prestressed concrete piles shall be cured in conformance with the provisions in Section 90-7.04, "Curing Precast Concrete Members," except that piles with a class designation ending in C (corrosion resistant) shall be cured as follows:

- A. Piles shall be either steam cured or water cured. If water curing is used, the piles shall be kept continuously wet by the application of water in conformance with the provisions in Section 90-7.01A, "Water Method."
- B. If steam curing is used, the steam curing provisions in Section 90-7.04, "Curing Precast Concrete Members," shall apply except that the piles shall be kept continuously wet for their entire length for a period of not less than 3 days, including the holding and steam curing periods.

90-7.06 CURING SLOPE PROTECTION

- Concrete slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."
- Concreted-rock slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing," or with a blanket of earth kept wet for 72 hours, or by sprinkling with a fine spray of water every 2 hours during the daytime for a period of 3 days.

90-7.07 CURING MISCELLANEOUS CONCRETE WORK

- Exposed surfaces of curbs shall be cured by pigmented curing compounds as specified in Section 90-7.01B, "Curing Compound Method."
- Concrete sidewalks, gutter depressions, island paving, curb ramps, driveways, and other miscellaneous concrete areas shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."
- Shotcrete shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."
- Mortar and grout shall be cured by keeping the surface damp for 3 days.
- After placing, the exposed surfaces of sign structure foundations, including pedestal portions, if constructed, shall be cured for at least 72 hours by spraying with water, or by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."

90-8 PROTECTING CONCRETE

90-8.01 GENERAL

- In addition to the provisions in Section 7-1.16, "Contractor's Responsibility for the Work and Materials," the Contractor shall protect concrete as provided in this Section 90-8.
- Concrete shall not be placed on frozen or ice-coated ground or subgrade nor on ice-coated forms, reinforcing steel, structural steel, conduits, precast members, or construction joints.
- Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to damage surface mortar or cause a flow or wash of the concrete surface, unless the Contractor provides adequate protection against damage.
- Concrete that has been frozen or damaged by other causes, as determined by the Engineer, shall be removed and replaced by the Contractor at the Contractor's expense.

90-8.02 PROTECTING CONCRETE STRUCTURES

- Structure concrete and shotcrete used as structure concrete shall be maintained at a temperature of not less than 7°C for 72 hours after placing and at not less than 4°C for an additional 4 days. When required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.

90-8.03 PROTECTING CONCRETE PAVEMENT

- Pavement concrete shall be maintained at a temperature of not less than 4°C for 72 hours. When required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.
- Except as provided in Section 7-1.08, "Public Convenience," the Contractor shall protect concrete pavement against construction and other activities that abrade, scar, discolor, reduce texture depth, lower coefficient of friction, or otherwise damage the surface. Stockpiling, drifting, or excessive spillage of soil, gravel, petroleum products, and concrete or asphalt mixes on the surface of concrete pavement is prohibited unless otherwise specified in these specifications, the special provisions or permitted by the Engineer.
- When ordered by the Engineer or shown on the plans or specified in the special provisions, pavement crossings shall be constructed for the convenience of public traffic. The material and work necessary for the construction of the crossings, and their subsequent removal and disposal, will be paid for at the contract unit prices for the items of work involved and if there are no contract items for the work involved, payment for pavement crossings will be made by extra work as provided in Section 4-1.03D, "Extra Work." Where public traffic will be required to cross over the new pavement, Type III portland cement may be used in concrete, if permitted in writing by the Engineer. The pavement may be opened to traffic as soon as the concrete has developed a modulus of rupture of 3.8 MPa. The modulus of rupture will be determined by California Test 523.
- No traffic or Contractor's equipment, except as hereinafter provided, will be permitted on the pavement before a period of 10 days has elapsed after the concrete has been placed, nor before the concrete has developed a modulus of rupture

of at least 3.8 MPa. Concrete that fails to attain a modulus of rupture of 3.8 MPa within 10 days shall not be opened to traffic until directed by the Engineer.

- Equipment for sawing weakened plane joints will be permitted on the pavement as specified in Section 40-1.08B, "Weakened Plane Joints."

- When requested in writing by the Contractor, the tracks on one side of paving equipment will be permitted on the pavement after a modulus of rupture of 2.4 MPa has been attained, provided that:

- A. Unit pressure exerted on the pavement by the paver shall not exceed 135 kPa;
- B. Tracks with cleats, grousers, or similar protuberances shall be modified or shall travel on planks or equivalent protective material, so that the pavement is not damaged; and
- C. No part of the track shall be closer than 0.3-m from the edge of pavement.

- In case of visible cracking of, or other damage to the pavement, operation of the paving equipment on the pavement shall be immediately discontinued.

- Damage to the pavement resulting from early use of pavement by the Contractor's equipment as provided above shall be repaired by the Contractor at the Contractor's expense.

- The State will furnish the molds and machines for testing the concrete for modulus of rupture, and the Contractor, at the Contractor's expense, shall furnish the material and whatever labor the Engineer may require.

90-9 COMPRESSIVE STRENGTH

90-9.01 GENERAL

- Concrete compressive strength requirements consist of a minimum strength that shall be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified in these specifications or the special provisions or are shown on the plans.

- The compressive strength of concrete will be determined from test cylinders that have been fabricated from concrete sampled in conformance with the requirements of ASTM Designation: C 172. Test cylinders will be molded and initially field cured in conformance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in conformance with the requirements of ASTM Designation: C 39. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

- When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in conformance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

- When concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall, at the Contractor's expense, make corrective changes, subject to approval of the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State \$14 for each in-place cubic meter of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to the State \$20 for each in place cubic meter of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. Concrete represented by a single test that indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials."

- If the test result indicates that the compressive strength at the maximum curing age specified or allowed is below the specified strength, but is 85 percent or more of the specified strength, payments to the State as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer

that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the requirements in ASTM Designation: C 42.

- No single compressive strength test shall represent more than 250 m³.
- When a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders that have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. When the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.
- When concrete is specified by compressive strength, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use will be required prior to placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.
- Certified test data, in order to be acceptable, shall indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of cure days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.
- Trial batch test reports, in order to be acceptable, shall indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 4 MPa greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches that were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.
- Tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. Equipment employed in testing shall be in good condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.
- The certified test data and trial batch test reports shall include the following information:
 - A. Date of mixing.
 - B. Mixing equipment and procedures used.
 - C. The size of batch in cubic meters and the mass, type, and source of all ingredients used.
 - D. Penetration of the concrete.
 - E. The air content of the concrete if an air-entraining admixture is used.
 - F. The age at time of testing and strength of all concrete cylinders tested.
- Certified test data and trial batch test reports shall be signed by an official of the firm that performed the tests.
- When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class of concrete required at that location.
- After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making changes that, in the judgment of the Engineer, could result in a strength of concrete below that specified.
- The Contractor's attention is directed to the time required to test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.
- When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

90-10 MINOR CONCRETE

90-10.01 GENERAL

- Concrete for minor structures, slope paving, curbs, sidewalks and other concrete work, when designated as minor concrete on the plans, in the specifications, or in the contract item, shall conform to the provisions specified herein.

- The Engineer, at the Engineer's discretion, will inspect and test the facilities, materials and methods for producing the concrete to ensure that minor concrete of the quality suitable for use in the work is obtained.

90-10.02 MATERIALS

- Minor concrete shall conform to the following requirements:

90-10.02A Cementitious Material

- Cementitious material shall conform to the provisions in Section 90-1.01, "Description."

90-10.02B Aggregate

- Aggregate shall be clean and free from deleterious coatings, clay balls, roots, and other extraneous materials.
- The Contractor shall submit to the Engineer for approval, a grading of the combined aggregate proposed for use in the minor concrete. After acceptance of the grading, aggregate furnished for minor concrete shall conform to that grading, unless a change is authorized in writing by the Engineer.
 - The Engineer may require the Contractor to furnish periodic test reports of the aggregate grading furnished. The maximum size of aggregate used shall be at the option of the Contractor, but in no case shall the maximum size be larger than 37.5 mm or smaller than 19 mm.
 - The Engineer may waive, in writing, the gradation requirements in this Section 90-10.02B, if, in the Engineer's opinion, the furnishing of the gradation is not necessary for the type or amount of concrete work to be constructed.

90-10.02C Water

- Water used for washing, mixing, and curing shall be free from oil, salts, and other impurities that would discolor or etch the surface or have an adverse affect on the quality of the concrete.

90-10.02D Admixtures

- The use of admixtures shall conform to the provisions in Section 90-4, "Admixtures."

90-10.03 PRODUCTION

- Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice that will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and that conforms to requirements specified herein. Recognized standards of good practice are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or the Department.
 - The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."
 - The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.
 - Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 32°C will be considered conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.
 - The required mixing time in stationary mixers shall be not less than 50 seconds or more than 5 minutes.
 - The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.
 - Each load of ready-mixed concrete shall be accompanied by a weighmaster certificate that shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The weighmaster certificate shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.
 - A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets contract requirements, including minimum cementitious material content specified.

90-10.04 CURING MINOR CONCRETE

- Curing minor concrete shall conform to the provisions in Section 90-7, "Curing Concrete."

90-10.05 PROTECTING MINOR CONCRETE

- Protecting minor concrete shall conform to the provisions in Section 90-8, "Protecting Concrete," except the concrete shall be maintained at a temperature of not less than 4°C for 72 hours after placing.

90-10.06 MEASUREMENT AND PAYMENT

- Minor concrete will be measured and paid for in conformance with the provisions specified in the various sections of these specifications covering concrete construction when minor concrete is specified in the specifications, shown on the plans, or indicated by contract item in the Engineer's Estimate.

90-11 MEASUREMENT AND PAYMENT

90-11.01 MEASUREMENT

- Portland cement concrete will be measured in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.
- When it is provided that concrete will be measured at the mixer, the volume in cubic meters shall be computed as the total mass of the batch in kilograms divided by the density of the concrete in kilograms per cubic meter. The total mass of the batch shall be calculated as the sum of all materials, including water, entering the batch. The density of the concrete will be determined in conformance with the requirements in California Test 518.

90-11.02 PAYMENT

- Portland cement concrete will be paid for in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.
- Full compensation for furnishing and incorporating admixtures required by these specifications or the special provisions will be considered as included in the contract prices paid for the concrete involved and no additional compensation will be allowed therefor.
- Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."
- Should the Contractor use admixtures in conformance with the provisions in Section 90-4.05, "Optional Use of Chemical Admixtures," or Section 90-4.07, "Optional Use of Air-entraining Admixtures," or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them into the concrete at the Contractor's expense and no additional compensation will be allowed therefor.